THE DOCK & HARBOUR AUTHORITY

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Editorial

Port of Basrah, Iraq.

The Port of Basrah, which is situated on the banks of the Shatt-al-Arab, which is a confluence of the rivers Tigris and Euphrates, is a comparatively new port, any activity on a big scale being commenced during the Great War when Basrah was developed for the purpose of handling troops.

The port first commenced its commercial activity when it was transferred from the military authorities on April 1st, 1920, and from then on it has made considerable headway as regards development and traffic handled.

The greatest difficulty which had to be overcome was the dredging of the Bar at the mouth of the Shatt-al-Arab, as this limited the size of vessels calling at the port to a draught of not more than 20 ft. Dredging first commenced in December, 1924, and vessels of 32 ft. can now pass the Bar in safety.

The port is well equipped with all mechanical appliances for the purpose of handling cargo, and also warehouses and transit sheds for the storing of goods. The principal imports consist of sugar, hardware, cement and piece-goods, and exports are chiefly made up of two commodities, grain and dates.

The Port of Basrah forms the supplement for this month's issue, and an illustrated article giving details of the port from its commencement appears on another page.

Manchester Ship Canal.

Manchester Ship Canal last month attained jubilee status, for it was on 6th August, 1885, that the Manchester Ship Canal Bill received Royal Assent.

The first definite steps were taken in 1881, when Daniel Adamson assumed leadership of the canal scheme and summoned a conference of the Mayors of Manchester and surrounding towns, capitalists, and commercial and labour leaders. Engineers were briefed, and the plan of Leader Williams was finally laid before Parliament.

As early as 1882, the Corporation resolved "to take up the question of the canal with the vigour and earnestness which its importance demanded." After the construction of the canal had begun and unexpected engineering difficulties were encountered, they agreed to give financial assistance to the extent of £3,000,000 and £2,000,000 on separate occasions.

After the work had been begun in November, 1887, floods and landslides delayed its progress, forcing the promoters to turn to Manchester Corporation for financial assistance. The Corporation reaped their reward in their subsequent representation upon the board of directors, and share in the direction of the undertaking. Not until 1st January, 1894, was the 36-mile canal opened to traffic, and it was formally opened by Queen Victoria in May. The first year's traffic reached 925,659 tons, as against 5,949,970 tons last year.

The Canal Company's authorised capital to-day stands at over £21,500,000, and the Manchester Dock Estate covers more than 400 acres. Manchester is the fourth port in the country.

Developments on the Tyne.

There was an unexpected development at the beginning of August when the London and North Eastern Railway announced their intention to reconstruct the West Quay at Tyne Dock on the River Tyne. It will be recalled that a month ago it was reported that the Tyne Improvement Commission had offered £450,000 to the London and North Eastern Railway for Tyne Dock, that that offer had been declined and that the London and North Eastern Railway Co., when notifying that fact, also stated that the Company's offer to sell the Dock to the Tyne Improvement Commission for £650,000 was withdrawn. That, explained Mr. Everett (Chairman of the Tyne Improvement Commission), would appear to be the end of the negotiations, at any rate for the present. Whether the present proposals of the London and North Eastern Railway mark the end of the intended developments by the Tyne Improvement Commission in the same area it is, at the present, impossible to say, but at least they seem another barrier in the way. It will be recalled that the suggestion that the Tyne Improvement Commission should purchase Tyne Dock arose out of the offer of Mr. Malcolm Stewart (the Commissioner for Special Areas) to make a grant of £275,000 for a deep water quay, that grant to be subject to arrangements being made in regard to Tyne Dock as an integral part of the scheme. Therefore, unless there is some unexpected development it would seem that the deep water quay scheme of Mr. Malcolm Stewart had come to an untimely end.

The scheme of the London and North Eastern Railway is to reconstruct the West Quay at Tyne Dock and to renew the crane equipment. The West Quay is used for the landing of timber cargoes and for the discharge of iron ore destined for the iron and steel works in Durham. The entire substructure of the quay is to be renewed, and on the completion of this work modern cranes will be installed. The present equipment of the quay is nine 1½ tons hydraulic cranes and three 3-ton electric cranes for working 1-ton grabs. It is proposed to replace these by ten 5-ton electric level luffing cranes, and three 2-ton grabs, and to transfer the three existing 3-ton electric cranes to the South-east Quay, so as to improve the cranage facilities there. The cost, it is understood, will not be less than £180,000.

Although it has little if anything to do with the trade of the district, it may be mentioned that the London and North Eastern Railway, when announcing Tyne Dock development also stated that it was their intention to electrify the Newcastle-South Shields branch line. The work it is expected will cost about half a million.

Southampton Docks Imports of Bananas up 58%.

Since the introduction of regular services from the West Indies and Central America in 1931, the import of bananas at the Southern Railway Docks at Southampton has shown a continuous increase.

During the first six months of this year, 938,052 bunches of bananas, weighing 15,361 tons, were landed, compared with 593,639 bunches for the first half of 1934—an increase of 58 per cent.

Preston Docks Jubilee.

Preston Docks have had a record year, and for the first time the combined imports and exports at Preston Dock have amounted to over a million tons.

This year is an important one, for the Port of Preston celebrates the jubilee of the laying of the foundation stone of the dock by the Prince of Wales, afterwards King Edward VII.

Although the dock still bears heavily in the rates, the indirect benefits which it brings are great. The undertaking employs a large number of men, whose wages are, for the most part, spent locally, whilst it is responsible for bringing industries to the town which otherwise would be set up elsewhere.

News from all Quarters

South Africa

THE criticism of the plans of the Railways and Harbours Administration for the improvement of Table Bay Harbour has lately become even keener, and representatives of the Capetown Chamber of Commerce have had an interview in Pretoria with Mr. Pirow, the Minister, at which they set out their objections. In answer to these the Administration has issued an official statement, which has now, in its turn, been severely criticised by the Chamber of Commerce, who describe it as "entirely misleading and inaccurate" and as "liable to prejudice the minds of the public." We give below some of the main assertions made by the Administration, with the criticisms attached to them by the Chamber of Commerce.

The statement contends that until the Nijhoff Report had been issued, Capetown had never asked for an all-weather berth. No delay had been caused to shipping, which might be described as unreasonable, and no protests had been received officially by the Administration from either the shipping companies or the Chamber of Commerce.

In reply, the latter states that both it and the Harbour Advisory Board have for many years been pressing for additional all-weather berths, and various schemes have been put forward by the Government's own engineers. In fact, the reason given by Mr. Pirow for calling in Mr. Nijhoff was that these schemes were so conflicting.

The statement refers to the Administration's promise before the publication of the Nijhoff Report of one ordinary berth and one all-weather berth for the new Union Castle Line ships, and also an up-to-date cold storage establishment. It says that the Union Castle Company fixed the period when these would be required as February, 1937.

According to the Chamber, the position now arises that until the knuckle berth is completed, the Victoria Basin must be used whilst one of the big mail-ships is at No. 7 Quay. It will be impossible to use the East Pier or No. 2 jetty. In effect, the harbour will lose two of its most valuable berths.

It is contended in the statement that the demand of the Chamber of Commerce for more berths is "inextricably mixed up with certain town-planning improvements for which members of the City Council are pressing."

The Chamber of Commerce replies that this statement is entirely without foundation, and that it has never confused the issue between town planning and harbour development.

The Administration's statement says that Capetown received every available harbour improvement before the City realised it wanted such improvements. Further harbour development is now occupying the attention of the Administration, but it is unlikely that any new work can be started before the work now in hand is completed, and, in any case, no scheme should be finally accepted until there has been exhaustive investigation.

To this the Chamber replies that investigations have been going on now for sixteen years, during which time—in 1921—a special Harbour Commission was appointed. In 1923 Sir George Buchanan was brought out to investigate, and in 1934 Mr. Nijhoff was also commissioned.

Finally, the Administration states that "there is no immediate hurry to come to any finality in regard to possible future developments." The Chamber of Commerce points out, however, that Mr. Nijhoff himself said that three berths were absolutely necessary, and that he proposed to have them ready within nine months.

Peru

Traffic figures for the harbour of Callao have just been issued for the year 1934. The ocean-going traffic is given as 338 vessels entering and clearing with 1,340,000 tons, in addition to which there were a further 22 arrivals or departures of vessels on coastal or shorter sea voyages with a tonnage of 49,000 tons. The total amount of goods exported from the harbour of Callao was 61,500 manifest-tons, no less than 28,000 manifest-tons of which consisted of copper bars. Complete figures for imports over the port are not to hand, but by far the largest item was coal, of which 10,000 tons were imported. It is anticipated that the traffic figures for the present year will show a considerable improvement over those for 1934, owing to the important extensions which have been carried out in the past year in the enlarging of the harbour.

Brazil

Statistics have recently been issued by the Bahia Statistical Office on the traffic handled in the Port of Bahia during the period January-April, 1935, which show both by weight and value a decrease in exports and an increase in imports. Exports fell from the 40,000 tons valued at 62,000,000 Milreis of January-April, 1934, to only 33,000 tons valued at 55,300,00 Milreis, whilst imports rose over the same periods from 22,000 tons valued at 18,200,000 Milreis to 35,000 tons valued at 27,600,000 Milreis.

Thanks to the recent dredging operations, the harbour of Ilhéos, the principal port of the cocoa-cultivating district in the south of the state of Bahia, was able to resume its traffic in the export of cocoa. It despatched altogether in the first four months of the current year 2,821,000 kilograms of cocoa and of piassava to the value of 4,190,000 Paper-Milreis, most of which were destined, as in former years, for the U.S.A.

Netherlands East Indies

The traffic of the harbour of Sourabaya has been declining steadily during the past few years. Imports have fallen from 796,000 tons in 1929 to 384,000 tons in 1932, 337,000 tons in 1933, and 278,000 tons in 1934, constituting a decrease from 1929 to 1934 of 65 per cent. Exports have also dropped over the same period by 47 per cent., or from 1,725,000 tons in 1929 to 1,122,000 tons in 1932, 848,000 tons in 1933, and 905,000 tons in 1934. The figures for the months January-May, 1935, which amounted to 129,000 tons of imports and 451,000 tons of exports, give prospects, according to the harbour authorities, of a total for the whole year of over 300,000 tons of imports and 1,000,000 tons of exports. It therefore appears that the lowest point of depression in the harbour traffic of Sourabaya has been passed, and a rapid recovery may be counted upon.

Canary Islands

In the year 1934 over 3,800 steamers with a tonnage of about 8,000,000 n.r.t. entered and cleared in the Port of Las Palmas in Grand Canary. The principal flags flown were as follows:

	Number of Vessels.	Tonnage in n.r.t.
Spanish	1,608	1,294,000
British	743	2,861,000
French	203	484,000
German	340	1,049,000
Norwegian	269	470,000
Italian	139	504,000
Dutch	135	491,000

U.S.S.R.

In the year 1934, 1,900,000 tons of goods valued at 29,500,000 gold roubles, and consisting almost exclusively of timber, were exported through the four principal harbours of the northern coasts of the U.S.S.R., Archangel, Onega, Mesen and Petshora. This is an increase over the previous year's figures of 8.06 per cent. by weight and of 34.4 per cent. by value. The export traffic was distributed amongst the four harbours as shown in the following table:—

	In tons.		Increase
	1934.	1933.	in per cent.
Archangel	1,618,000	1,496,000	8.13
Onega	206,000	195,000	5.30
Mesen	88,000	81,000	9.02
Petshora	24,000	19,000	26.30

The above goods were shipped on vessels of a number of nationalities, the four harbours taken together being visited by 687 ships with a total tonnage of almost 1,000,000 n.r.t. It is stated that, whilst the harbour of Leningrad fulfilled only 91 per cent. of its last half-yearly plan, Archangel succeeded in completing its schedule in full, though not without a considerable strain being put upon both the men and machines engaged in the loading.

Danzig

The number of vessels entering the harbour of Danzig during the month of July amounted to 478 with 241,000 n.r.t., as compared with 365 vessels with 220,273 n.r.t. in the previous month, and 461 with 240,000 n.r.t. in July, 1934. The number clearing amounted to 473 vessels with 246,000 n.r.t., as compared with 369 with 215,295 n.r.t. in the previous month, and 448 with 246,000 n.r.t. in July, 1934. Whilst these figures appear by no means unfavourable it must be noticed that in July, 1935, the number of ships entering without cargo was very high, and only 189 ships with 113,000 n.r.t. entered loaded. Moreover, the total figures for the month include vessels entering Danzig as an emergency harbour, their number (24 ships with 10,600 n.r.t.) being comparatively high owing to the stormy July weather. Finally, in both incoming and outgoing traffic, the turnover in mass goods has been far more favourable than that in piece-goods.

Notes from the North

Quick Cargo Handling.

RECENTLY, a steamer discharged 5,200 tons of cargo in 28 hours at Birkenhead Docks. The s.s. "Mervyn" arrived at 6.30 a.m., with a cargo of iron ore. She docked at Rea's Jetty, and at 8 a.m. the gear had been erected for discharging the ore into railway wagons. By 11.30 a.m., on the following day, the whole cargo had been dealt with, including stowing in the wagons and also weighing. Ten special trains were utilised, and the first left at noon on the day discharging commenced, and the last one was cleared just 24 hours later. The whole operation of discharging, packing, weighing and despatching of 5,200 tons occupied exactly 28 hours, or at the rate of 160 tons per hour.

Slag Revetment.

Work is in progress on the construction of a slag revetment parallel to the River Alt, where it empties itself into the River Mersey. The revetment will take about another 18 months to complete. When finished it will run in a south-westerly direction across the shore to low-water mark, and consequently right across the path of the River Alt. The purpose of this wall, the top of which will be about 10 ft. above sea level and over 1,800 ft. long, is to alter the course of the Alt and cause it to enter the Mersey a good deal higher than it does at present. If the scheme is successful, it will protect the coast from erosion and cause the Alt to take the sewage more direct to the Mersey.

Menai Bridge.

Caernarvon Town Council has approved the following resolution:—"That His Majesty's Government be requested to earmark the surplus monies received from the Menai Suspension Bridge tolls towards the cost of providing a new bridge or tunnel."

Preston Docks Inspection.

On the occasion of the annual inspection of the Ribble Dock undertaking, Mr. J. G. Merriweather (the general superintendent and traffic manager) mentioned that the total net registered tonnage of all vessels using the port was 579,525 tons, and the number of ships dealt with was 1,515. The largest vessel so far to arrive at the Port docked this year—the s.s. "Nordanvik" (4,808 tons). The total weight of imports during the year, 799,300 tons, created a record, exceeding the previous highest by 47,546 tons. Wood pulp, roadstone, timber, bitumen grain, cement and china clay record increases, against which were decreases in motor spirit and slates.

The total weight of exports—200,928 tons—showed a satisfactory increase of 24,828 tons. The combined imports and exports amounted to 1,000,258 tons, exceeding the previous year's total by 72,374 tons.

The gross working surplus, amounting to £74,554, was the highest recorded. Income rose from £228,519 to £238,867. On the expenditure side there had been a notable decrease in dredging maintenance of £9,358. The total working expenses of £164,313 showed a reduction of £1,215. The cost of the undertaking to the town in 1925 was a 1s. 4d. rate. It was reduced in the following year to 1s. 2½d. It was subsequently further reduced to 1s. 0½d., and last year it was again reduced to 11½d.

The prospects for the current year were somewhat obscured by some instability in the timber trade, large stocks having been held over from last year, and motor spirit was likely to record a decrease due, in the main, to the movement of the Texas Company.

Mr. A. H. Howarth, engineer to the undertaking, explained that the highest point in the bed of the river, which was the ruling depth for navigation, had ranged during the first-half of this year from 1 ft. 4 in. to 3 ft. 7 in., which gave an average of 2 ft. 2½ in. above sea low water. This, as compared with the corresponding period last year, showed an improvement of 2 ft. 2½ in. in the average available depth of water in the navigable channel.

Seawards of the 14¼ miles of river, the navigable channel had for many years meandered at will, owing to its not being regulated by training works. This made navigation, particularly of the large type of vessel frequenting the port, extremely difficult at times. To obviate this undesirable condition at the sea end of the river, Parliamentary powers were obtained in 1931 for the extension of the training walls from 14¼ to 16 miles, as recommended by the Ribble Navigation Commission of 1891. A commencement was made on the construction of thsi extension in May, 1932.

Benefit is now being derived from the partial extension of the south wall. This extension, by directing the tidal water on to the sandbank occupying the line of the intended channel, has forced a passage through the bank, the channel being straightened and brought more to the desired central position. Since May this year, the course taken by vessels entering and leaving the trained channel is direct to and from the sea, and not as formerly round the circuitous course which was for so long necessary owing to the channel beyond the influence of the training walls, having gradually moved southwards since 1925.

Members of the Council examined the new £21,000 dock offices which are in course of erection. Afterwards, they inspected the loading and discharging of vessels in the dock and the workings of the locks. At the Naze they saw a sand pump at work, some of the members remaining on board and sailing out to sea with her. The remainder continued down the river and visited a dredger at work, loading clay into the hoppers and discharging it to form the extension of the south training wall.

Heysham Harbour.

The £5,000 improvement scheme at Heysham Harbour, where a considerable extension has been made of the lairages used for the accommodation of Northern Irish cattle during the detention period, is now complete. This extension, which enables an additional 350 head of cattle to be accommodated, has been necessitated by heavy increases in the shipments of livestock from Belfast and Londonderry.

Dee Conservancy.

Dee Conservancy Board reports that soundings reveal that the available depth in the navigable channel between Chester and Connah's Quay is practically the same as in May. Below Connah's Quay the conditions are much the same, and there is no improvement either in course or available depth. The repair of the south training wall is proceeding, and in addition several boat-loads of heavy material have been deposited on the northern training wall.

I.O.M. Harbour Commissioners.

In their annual report, the Isle of Man Harbour Commissioners state that the reconstruction of the Old Pier Head at Peel was necessary, because decay had begun to seriously impair its effectiveness. Work was commenced in November last, and during the period it was carried on, 35 ft. of the old wall were pulled down and 31 ft. of the new wall built in mass concrete; work will be carried on again during the coming winter. Groyne has been kept in good repair and is still holding up very large quantities of sand which would otherwise drift in the harbour mouth and over towards the breakwater, but it is now loaded to its capacity. Silting: Soundings taken show that the total quantity of silt which is now contained in the 1914 dredged area adjoining the breakwater, amounts to 49,462 cub. yds. since 1914; the figure for 1934 is 43,530 cub. yds., so that the amount of the silt has increased by nearly 6,000 cub. yds.

The north wall of the Red Pier, Douglas, has been extended 112 ft. at foundation level and 87 ft. at surface level, the south wall has been extended 112 ft. at foundation level and 120 ft. at surface level; these two walls have now reached the landward face of the solid head, and from this point are incorporated in it.

The solid head of the extension is now under construction and has been built up to low-water level, which is 15 ft. above the sea bed; this means that the extension has reached its designed length of 400 ft. from the line where the east face of the Old Red Pier Head used to be and 460 ft. from the line at which the demolition westwards of this Old Pier Head was stopped. At the north side four flights of landing steps have been completed, together with mooring bollards and water supply. All the rubble hearting of the pier has been deposited, the total quantity being 35,182 tons of rubble filling.

During the past year 36 excavations have been made into the clay, and a like number of concrete foundations placed and columns built up to deck level. The whole of the horizontal walling and diagonal struts have been made and built into position. All the foundations, columns, wallings and struts in connection with the viaduct are now completed. On the southern portion of the viaduct 24 main beams, 92 secondary beams, and 640 yds. of decking have been built. The solid triangular portion of concrete mass-work connecting the east end of the viaduct to the extension is under construction.

The petrol-driven crane, which was installed on the Victoria Pier, Douglas, in June, 1933, has proved satisfactory and quite sufficient for dealing with the increased traffic in motor cars and cycles; the electric crane which formerly performed this work has been taken over to the Battery Pier and placed there

Notes from the North—continued

to deal with cargo traffic primarily handled by the Dublin and Silloth Steamship Company, and has been found very useful.

It will be necessary, within the near future, to adopt remedial measures to ensure the stability of the head of the North Breakwater, Ramsey. The necessary cleaning and painting has been carried out. A considerable quantity of material was excavated from the Upper Harbour opposite the Salt Works, Ramsey, to improve the access for vessels to this quay. An inspection of the under-water work at Queen's Pier was made by divers when everything was found to be in good condition. Extensive repairs to the decking have been necessary and are still in hand.

Wallasey Ferries Undertaking.

Wallasey Corporation has decided to engage the services of a firm of chartered accountants and also a firm of marine engineers to inquire, without restriction, into the operation of the ferries undertaking, and to submit any recommendations which, in their view, would improve the efficiency or economical working of the undertaking.

Tunnels Effect on Ferry.

Statistics have been issued by the Wallasey Corporation showing the serious effect on the Wallasey Ferries of the Mersey Tunnel competition. There has been a fall in the receipts on the ferries from £222,327 a year ago to £194,876 during the year ended March 31st last. The gross profit on the ferries fell from £74,677 to £54,146, of which latter amount £53,122 was paid away in loan charges.

The number of vehicles conveyed on the goods steamers dropped from 527,508 to 403,346, the latter reduced total being for the period including the nine months which had elapsed since the opening of the tunnel. The goods steamers are still carrying upwards of a thousand vehicles per working day.

Dredging at Maryport.

The dredging of Maryport pier entrance, harbours and basins, which is being undertaken from a block grant of £4,000 made by the Special Areas Commissioner, is almost completed. The mud banks have been removed, and there is now a greater depth of water than has been the case for many years. The Senhouse Dock is capable of taking some of the largest vessels, and the Elizabeth Dock will accommodate all types of vessels up to three thousand tons, and drawing from 18 to 20 ft. of water.

Transfer from Birkenhead.

The Anchor Line, a number of whose vessels for Bombay, Egypt, and India, have hitherto loaded in Birkenhead, have transferred their loading berths to No. 1 Branch Dock of the Alexandra Dock, Liverpool. For some years all the Anchor Line boats have discharged at the Gladstone Dock, Liverpool, but some have been loaded at Liverpool and others at Birkenhead. It has been decided, on grounds of economy, to transfer all the loading operations to Liverpool, as it is more convenient to carry out the discharging and loading of cargo on one side of the river.

Ship Canal Company's New Fireboat.

Manchester Ship Canal Company's new fire-boat, "Firefly," is fitted with the latest fire-fighting devices and, in particular, with those of value in dealing with oil fires. Ninety feet long, she is also a tug—the most powerful of a fleet of 33 steam-tugs and 20 Diesel-engined towing vessels. Pumping equipment will either direct water on to a fire or remove water from a vessel. Either operation can be accomplished at a rate of 4,000 gallons a minute by means of two steam-driven pumps.

Aden Port Trust

The returns of shipping using the Port of Aden for the month of June, 1935, are as follows:—

	No.	Tonnage
Merchant Vessels over 200 tons ...	143	598,955
,, ,, under 200 tons ...	4	648
Government Vessels	5	11,771
Dhows	85	2,799
PERIM.		
Merchant Vessels over 200 tons ...	26	68,493

The number of merchant vessels over 200 tons that used the port in June, 1935, was 143, as compared with 120 in the corresponding month last year, and the total tonnage was 599,000, as compared with 480,000.

Excluding coal, salt, fuel oil and Military and Naval Stores and transhipment cargo, the total tonnage of imports in the month was 10,500 and of exports 7,100, as compared with 9,400 and 5,000 respectively for the corresponding month last year.

The total value of imports, excluding Government Stores, was Rs. 54,07,000/-, as compared with Rs. 42,01,000/- for June, 1934, and of exports Rs. 35,27,000/-, as compared with Rs. 25,96,000/-.

The total value of both imports and exports together was Rs. 89,34,000/-, as compared with Rs. 67,97,000/- for the corresponding month last year.

Imports during the month were above those for June, 1934, in the case of coffee, gums and resins, hardware, raw hides, seeds, sugar, white and printed or dyed piece-goods, twist and yarn, manufactured tobacco, and private treasure; and below, in the case of grain, pulse and flour, raw skins, grey piece-goods, and unmanufactured tobacco.

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TRADE OF THE PORT.

Article.	Unit	Imports		Exports	
		Quantity.	Value Rs.	Quantity.	Value Rs.
Coal	Tons	2,448	48,965	0	0
Coffee	Cwts.	6,042	1,70,655	7,318	2,47,386
Grain, Pulse and Flour	,,	66,336	3,25,559	44,147	2,04,698
Gums and Resins	,,	2,680	46,283	2,989	69,886
Hardware	—	0	43,983	0	43,955
Hides, raw	No.	2,242	5,326	6,907	8,053
Oil, Fuel	Tons	84,030	19,82,997	0	0
,, Kerosene	Gls.	30,896	20,994	4,768	3,152
,, Petrol	,,	44,023	38,899	3,200	3,200
Salt	Tons	0	0	22,200	2,36,200
Seeds	Cwts.	5,757	48,356	349	3,549
Skins, raw	No.	349,350	1,34,289	486,868	3,44,627
Sugar	Cwts.	45,482	2,17,313	31,978	1,50,663
Textiles—					
Piece Goods, Grey	Yds.	2,106,526	2,75,939	2,369,860	3,00,717
,, ,, White	,,	984,899	1,58,606	314,695	51,514
,, ,, Printed or Dyed	,,	1,350,836	2,33,723	1,257,975	2,84,978
Twist and Yarn	Lbs.	209,600	88,850	233,297	1,01,058
Tobacco, Unmanufactured	,,	272,776	34,832	728,028	1,23,139
,, Manufactured	,,	89,600	59,990	25,990	20,525
Other Articles	No. of Pkges.	55,967	10,67,873	19,460	5,47,461
Treasure, Private	—	0	4,04,031	0	7,82,300
Total ...	—	—	54,07,463	—	35,27,061

Hull and the East Coast

Contract let for Landing Stage and Approach Bridge at Hull.

IN connection with the improvements in the Humber Ferry Service between Hull and North Lincolnshire, the Hull Corporation have accepted the tender of Tarran Industries Ltd. for the construction of a pontoon landing stage and approach bridge at the Victoria Pier for £38,682. In addition the Corporation have undertaken to pay the London and North-Eastern Railway Company £760 in respect of the adaptation by that Company of the adjacent Minerva Pier to make it suitable for use during the carrying out of the larger works at the new landing stage, the cost of the reconstruction of the pier which is now proceeding being £5,931. The total estimated expenditure on the scheme is £45,870. The Corporation have power to borrow £35,000 under the Public Works Facilities (Kingston-upon-Hull Victoria Pier) Confirmation Act and it is stated that the balance may be borrowed with the consent of the Ministry of Transport. The contract has been accepted subject to this consent being obtained. The loan charges on the balance, viz., £10,870, if based upon a 15-year loan period, will, it is calculated amount to £1,019, which is equivalent to a rate in the £ of .156 of a penny. It is, however, anticipated that this sum will be met out of revenue from tolls. The pier improvement scheme is the contribution of the Hull Corporation to the modernising of the ferry facilities, for which the London and North Eastern Railway on their part have provided two new and up-to-date steamers, and in addition are carrying out works of reconstruction at their railway pier at New Holland on the Lincolnshire bank of the Humber. A suggestion has been made for the provision of an open-air swimming pool at the new Victoria Pier, but further consideration of this has been deferred to enable an inspection of the proposed site to be made.

Humber Road Bridge Project revised.

The proposal to build a road bridge across the River Humber and North Lincolnshire has been revived by the Hull Corporation and placed before the Minister of Transport for his consideration and approval. At the interview at the Ministry of Transport, Mr. Ralph Freeman (Sir Douglas Fox and Partners) was present, and it was pointed out that for the Minister to consider the project fully and adequately a detailed engineering report would be necessary, towards the cost of which it was most likely that the Ministry would be prepared to contribute.

Mr. Freeman agreed, if this course was adopted, to limit his charges for this purpose to £500. To enable the report to be furnished, the Hull Corporation have approved expenditure up to this amount. The first steps for the revival of the scheme were taken in March last, when the Parliamentary Committee of the Hull Corporation reported that they had received information that the objection formerly raised to the bridge on the ground of possible obstruction to the navigation on the Humber could be removed. The scheme in its revised form, it is understood, provides for a single span over four thousand feet long, which if undertaken, would represent a remarkable advance in bridge construction in Great Britain. There are two bridges with a span approximating to this in America, but nothing approaching it has been suggested here before. The scheme emanates from Mr. Ralph Freeman, who was responsible for the design of the Humber Bridge put forward in 1930, and who helped to build the bridge at Sydney in Australia.

The 1930 scheme provided for a road bridge from Hessle near Hull to Barton-on-Humber on the opposite bank of the river 3¼ miles long, including approaches. The length of the bridge proper from foreshore to foreshore was to be 6,400 feet with a centre span of 900 feet, and carried across on fifteen piers. Strong objection was raised by the Humber Conservancy Board shipping and river interests, whose contention was that the piers would interfere with the navigable channel and be a danger to shipping. The plans were amended to reduce the piers to seven and in this form a Select Committee of the House of Commons approved the preamble. Before the Bill could proceed to the House of Lords the General Election intervened. The Government had promised to provide 75 per cent. of the estimated cost of £1,750,000, but the Minister of Transport (Sir P. J. Pybus) in the new Government was unable to confim that offer on the grounds of national economy. To meet the new situation thus created, the Hull Corporation produced fresh financial proposals under which the whole of the cost of the project was to be met by the issue of £2,000,000 five per cent. debentures on the security of the tolls levied for the use of the bridge. The Bill had been kept alive from one Parliament to the next, but in February, 1933, the Deputy Speaker ruled that it could not be submitted for third reading because of the fundamental alteration made by the withdrawal of the promised Government grant, and the Bill was withdrawn. The revival of the project has aroused the liveliest interest in Hull and elsewhere, while the outlook regarding the financial side and the possible removal of former objections is considered to be very favourable. In the 1930 scheme the money was to be provided by the Government plus contributions from local authorities together with tolls over a limited period. In the event of the project being proceeded with, the Hull Corporation would reimburse the London and North Eastern Railway Company for expenditure incurred in improving the ferry service, the compensation to be on a decreasing basis, account being taken of the age of the works superseded by a bridge or tunnel.

Bridlington Harbour Dredging.

Approximately 50,000 tons of mud have been removed from the harbour at Bridlington (East Yorkshire) by the dredger "Rosevis" since its acquisition a few months ago. The Harbour Commissioners decided to suspend operations during August, when the Harbour was used to its fullest capacity by pleasure craft and the Royal Yorkshire Yacht Club and visiting yachts. The intention of the Commissioners is to remove at least 100,000 tons of material, towards which satisfactory progress has been made. Already considerable benefits have accrued from the dredging operations. With a view to avoiding congestion at the mouth of the harbour at certain states of the tide, a conference of representatives of the Harbour Commissioners and owners of craft has been held. The main object sought was a free passage at all times for the boats of the Royal Air Force and fishing vessels. It was decided that at a certain state of the tide—i.e., when the depth of water has been reduced to a few feet—a green flag shall be shown at the Harbour to indicate that all craft with passengers must remain outside and clear of the harbour mouth, in order to leave a free passage. Passengers desiring to land during this period will have to be ferried to the landing stage.

Scheme for new road at Bridlington Harbour.

Further substantial progress has been made in the negotiations between the Bridlington Harbour Commissioners and the Bridlington Corporation relative to the proposed construction of a new road across the west end of the harbour, the effect of which when carried out will be to link the north and south sides of the town and provide a continuous sea frontage or promenade of nearly three miles. The draft scheme which involves, among other things, the exchange of lands and property has been finally revised and settled at a series of joint meetings between representatives of the two bodies and has since been accepted by the Corporation subject to the necessary consents and approval of the appropriate Government departments. It is agreed that the details of the proposed works to be constructed by the Corporation shall be submitted to the Harbour Commissioners for their information and approval before submission to the Government departments and that all reasonable expenditure incurred by or with the approval of the Corporation in connection with the carrying out of the scheme, including if necessary a Parliamentary Bill, the preparation of conveyances, deeds of exchange, and other documents and incidental costs be paid by the Bridlington Corporation. The agreement also provides that the Corporation shall fill in Clough Hole with spoil out of the harbour under the direction of the Commissioners' engineer, and that when the new road is made the Corporation shall construct certain warehouses, sheds, wharves, etc., for the convenience and use of the fishing industry and general shipping trade.

Grimsby's New Dock.

The Grimsby Corporation have approved of a lease and ordered their seal to be affixed thereto by which the London and North Eastern Railway Company become tenants of the new dock recently constructed at a cost of £1,500,000, until by annual payments the whole of that sum has been refunded to the town. This is in accordance with the arrangement made by the Grimsby Corporation to finance the undertaking. When the last payment shall have been made, the Corporation will formally hand the dock over to the London and North Eastern Railway to become their own property. The Corporation have obtained permission to operate a bus service on the dock estate and are negotiating for the public to have the right to visit the dock for inspection on certain weekday evenings and on Sundays during the summer months.

The Port of Basrah, Iraq

The River Shatt-al-Arab with its Extensive Approaches from the Open Sea to Nahrumar, a distance of 100 miles, as well as the Wharves, Jetties, Dockyards, Airport, etc., covering an Area of 2,000 acres, constitutes the Port of Basrah, under the Administration of the Basrah Port Directorate.

The History of the Commerce of Basrah dates back several thousand years, but more has been attained during the last twenty years in the Development of the Sea-gate of the "Land of the Two Rivers" than in all the past centuries. It is difficult to illustrate completely the difference between the Modern Port of to-day and the conditions existing some twenty years back. This Article, however, records the Port's achievements in the changes that have been introduced with the building-up of the present system.

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Section of the Port Marine Dockyard and Workshops, Margil, Basrah.

Historical Note

BASRAH takes its name from the great camp founded by Omar the Second Caliph in A.D. 637 to control lower Iraq, and especially the sea approaches. The Arabs deliberately chose a site inland for health reasons. From this military camp sprang the famous City of Basrah, where philosphers, poets, historians and theologians founded important schools which influenced all Islamic thought and Arabic literature. This literature, however, does not tell us much of the Port of Basrah as it was; nevertheless, few cities have enjoyed such an importance in the Islamic world as this "Venice of the East."

The town of Basrah lies on the Shatt-al-Arab some eighty-five miles inland from the Persian Gulf. The original City was founded in the spring of the year 637 A.D., near Zobeir, where the ruins are still visible about eight miles from the town of to-day. Tabari (838 A.D.) mentions in his great "History of Nations and Kings," that "Basrah became the outpost of the Empire, which was being founded by the Arabs, and it was the anchorage for boats from China and the lower countries."

Basrah was famous in the time of Haroun-al-Rashid, but declined in importance with the decay of the Abbasid Caliphs. As time went on, the canals on the edge of the pebbly Arabian plateau on which the City stood were neglected and, finally, as the silt accumulated all communication with the Persian Gulf was cut off, with the consequence that the original City of "Sindbad the Sailor," famed for its wealth and size, declined in importance, and was slowly abandoned on the transfer of the town to the new site.

The town was taken by the Turks in the Fifteenth Century, but has since undergone many changes of fortune. But though by the end of the Nineteenth Century it had become an important port for the import and export trade of Iraq, it did not recover a tithe of its former greatness.

With the advent of the British entry during the Great War, 1914-19, Basrah became the base for a large expeditio ary force, and the history of the "Modern Port of Basrah" can be said to have begun. Many improvements have since been effected, and both the town and the port are growing in importance.

The present City is situated on the banks of the Shatt-al-Arab, i.e., the confluence of the rivers Tigris and Euphrates. The City proper lies three miles west of the river on the Ashar Creek, at and around the entrance of which is the quarter called Ashar, where all the important Iraqi and foreign business houses are established.

The population of Basrah is composed of 85,000 Arabs and a few foreign communities.

Before the War there were no port facilities at Basrah, except three Customs examination sheds. The bar at the mouth of the Shatt-al-Arab made it impossible for vessels drawing more than 19 ft. to enter the river. All loading and unloading of ships was done in stream by means of lighters, and, in general, the conditions were exceedingly primitive.

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Aerial view Headquarters Offices and Main Gates, transit Area.

The Constitution of the Port

The Port of Basrah Directorate is an Authority of a quasi-autonomous nature, with its own finances. It is controlled by the Ministry of Finance with the Port Director and Director-General of Navigation as the Head of the Administration.

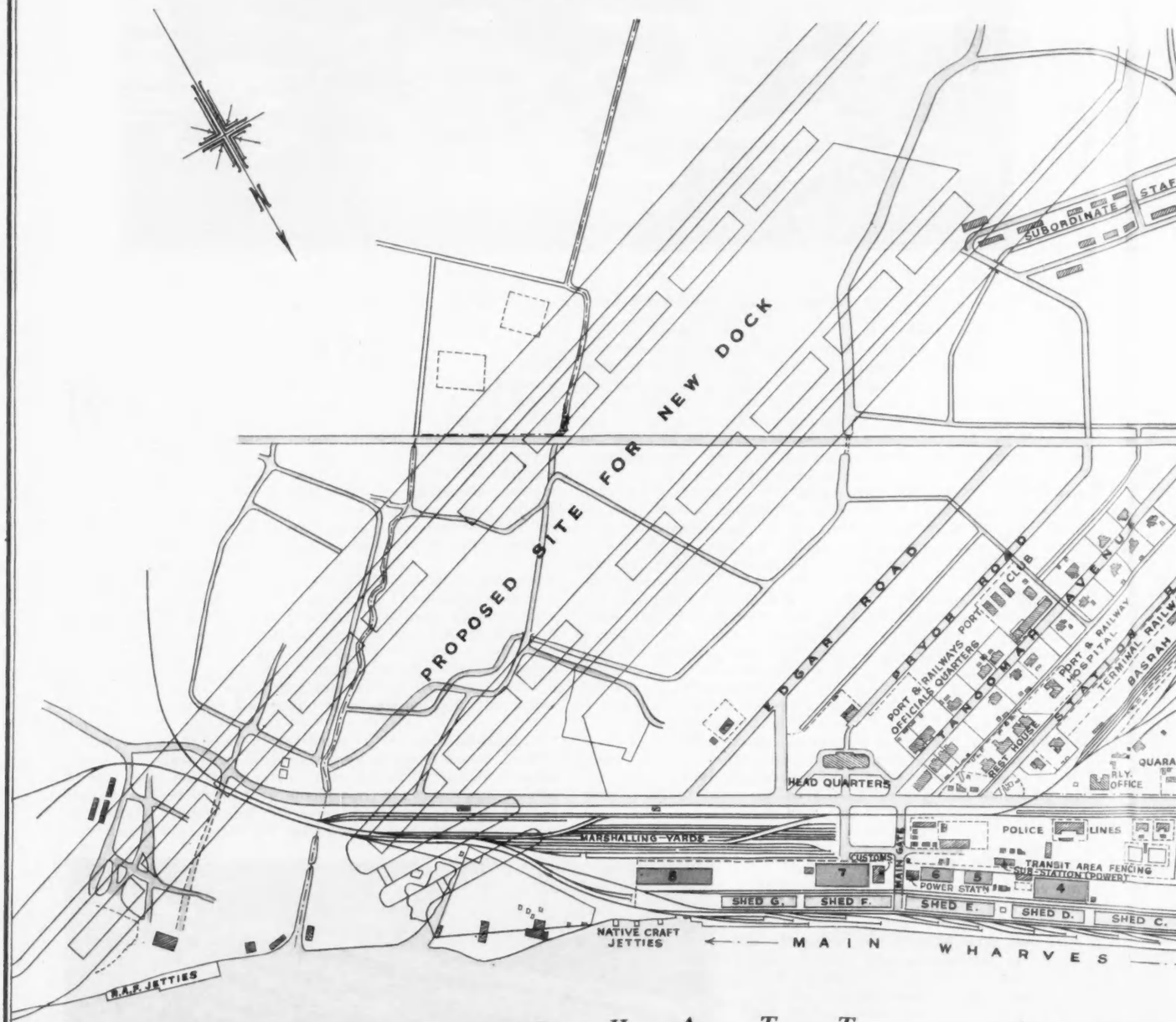
On the establishment of the provisional Iraqi Government in November, 1921, the Basrah Port Directorate, which up to that time had been administered by the British Military Authorities, was placed under the control of the Iraq Ministry of Commerce. When this Ministry was abolished in July, 1922, the port was transferred to the Ministry of Finance, which has been responsible for its administration thereafter. The Financial Agreement, concluded under the Treaty of 1922, which was ratified in December, 1924, provided that the Port of Basrah

PORT OF BASRAH.

MAIN WHARVES AT MARGIL.

REFERENCE.

River and Creeks ... ... shown Blue
Transit Sheds ... ... ,, ... Light Red
Warehouses ... ... ,, ... Dark Red
Roads ... ... ,, ... Brown
Air Port (under construction) ,, ... Yellow
Proposed Future Development ,, Light Green.



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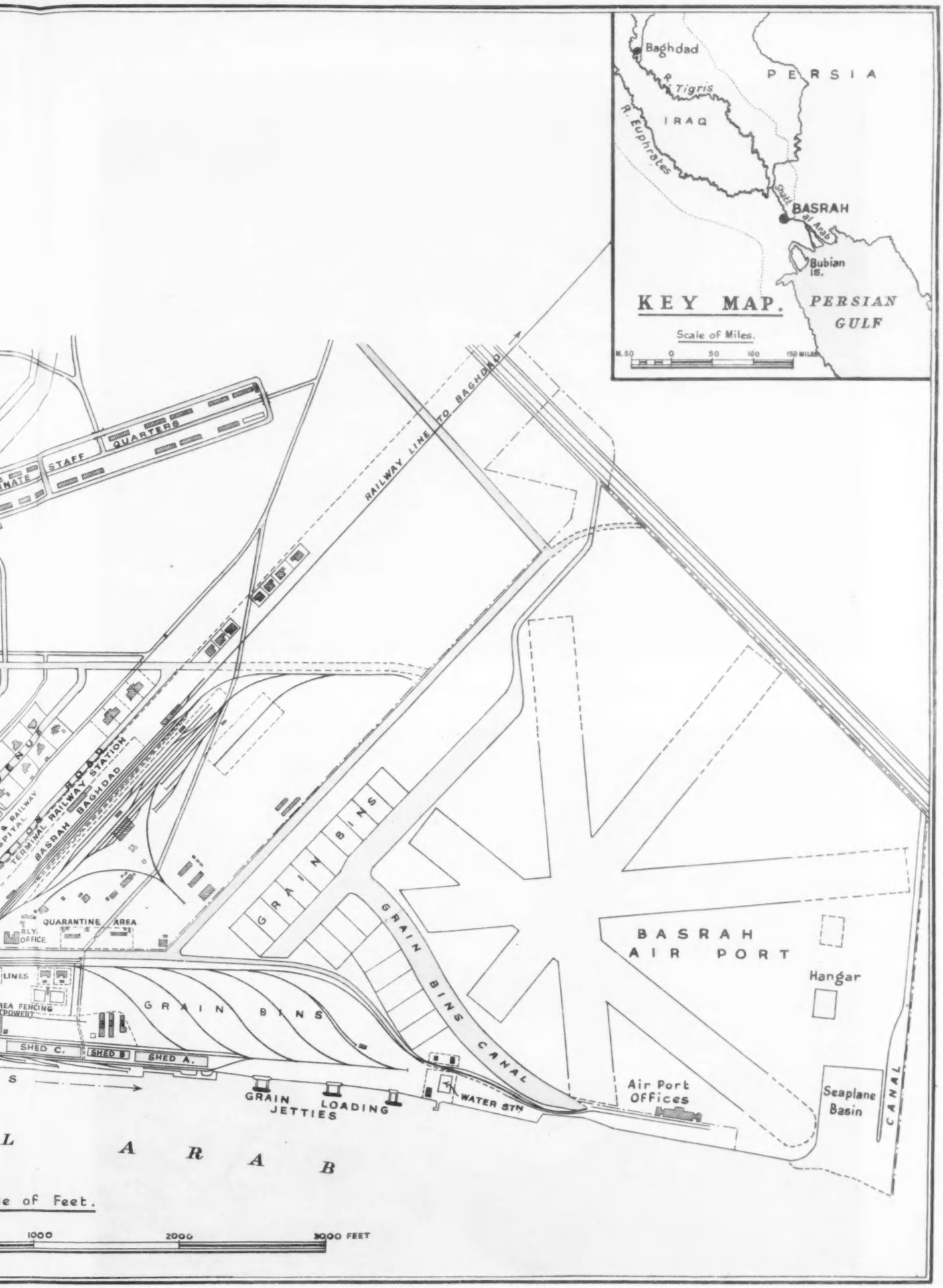
HARBOUR AUTHORITY, SEPTEMBER, 1935.



LITHO. HARCOURT ST. MARYLEBONE, W.

Port of Basrah

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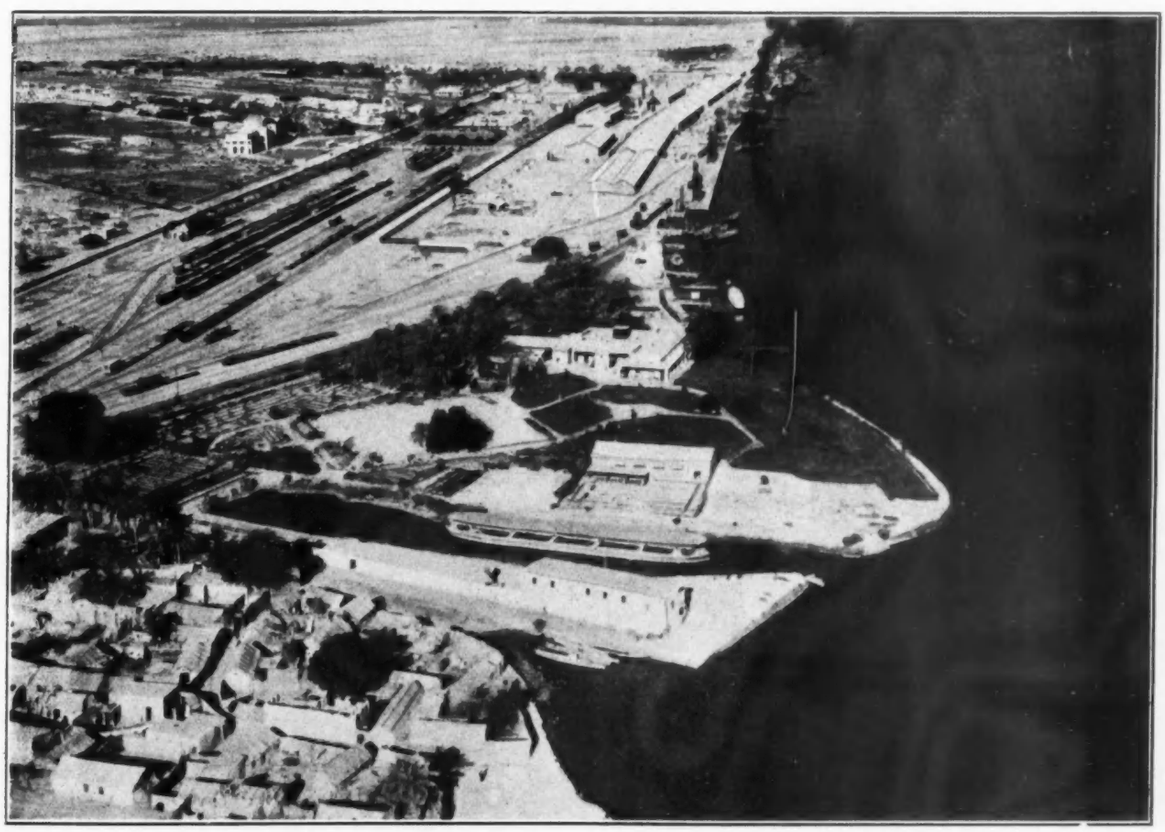
Aerial view of Northern Portion of the Port Area, Margil.



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Aerial view of lower end of Main Wharves, Margil, Basrah.

Port of Basrah—continued

General view Margil Wharves from left bank of river.

should be transferred to a Port Trust, and that the conditions of transfer should be dealt with separately, and should include the following:—

(1) Port receipts and expenditure should be excluded from Iraqi general accounts, and a Port Trust should be set up with the authority of the Iraqi Government, to administer the port.

(2) The valuation of the port should be treated as a debt of the Port Trust to the British Government. The terms and conditions on which the Port Trust should operate were to be subject to the approval of the British Government, and to be dealt with by separate arrangement in consultation with the Iraqi Government, who agreed to facilitate negotiations for the establishment of a Port Trust, and to secure its position in Iraq by such legislation as might be necessary.

(3) Under the existing Treaty of 1930 provision is made for the transfer of the actual property of the Port of Basrah, at present held by the British Government to the Iraqi Government, on the establishment of a Port Trust. Simultaneously with this transfer the Iraqi Government will confer full beneficial ownership upon the Trust for the period during which any part of the debt owing to the British Government remains outstanding.

The Port Trust has not yet been brought into being; receipts and expenditure have, however, been excluded from the general accounts of the Government, and the exact terms of repayment of the debt to the British Government have been negotiated by separate agreement. The annual instalments of the debt have been regularly paid for the last twelve years, the original debt of £540,874 having thus been reduced to £321,424, and if the Port Trust is established it will inherit the remainder of this obligation as originally contemplated.

The Early Progress of the Port

Prior to the War, when the average number of ships in port did not exceed two at any one time, and cargo was more or less of an easily portable nature, all unloading was done by lightering in mid-stream, with the exception of the German railway material, for which heavier type of cargo it was found expedient to construct a temporary jetty at Margil. The latter provision is interesting in that it may be said to have foreshadowed the need of plant such as now exists, capable of dealing with the class of cargo which modern development is bringing into the country.

Early Construction.

With the outbreak of the War and the subsequent influx of large numbers of troops, conditions quickly changed as a result of the development of the port. Port equipment of the most modern type was brought out, wharves were constructed, land was reclaimed and railway sidings were laid down at heavy expense. The village of Margil, some four miles upstream of Ashar itself, was chosen as the site for the main wharves, since there is a deep channel of some two miles alongside the river bank at this point, which reduced wharf construction to the minimum.

The site on which the port wharves and warehouses now stand, at the time the Army commenced work, consisted of only a swampy shore of low-lying date groves, closely intersected by the customary creeks and irrigation ditches. No conveniences of any kind whatsoever existed, and the first operation undertaken had to be the actual raising of the land to above flood level, before it could be utilised for the purposes intended.

War Progress.

The necessary work of reclamation was carried out by the Army; wharves were constructed, electric and steam cranes provided, railway sidings laid down, and other plant necessary for the rapid landing of cargo was imported with all possible speed, so that when hostilities ceased, though not in a position to offer the entire amenities of a modern commercial port, the Directorate was well found in many of the most important essentials.

Transfer to Commercial Administration.

In May, 1919, the Army Authorities realising that the port as a purely military establishment had served its purpose, and desirous of being relieved of its upkeep to some extent at least, and likewise realising that its services extended to commerce would afford valuable assistance to trade, opened investigations with a view to placing it on a commercial footing, to be under the control of the Civil Government and to be run on lines similar to other commercial ports.

After negotiations a Proclamation to legalise the necessary changes was drawn up, known as the Port of Basrah Proclamation, 1919 (Provisional) which was promulgated on 9th October, 1919. All Proclamations issued by the Commander-in-Chief of the Army of Occupation had the force of law. This Proclamation is the Port of Basrah Code, and by the Organic Law of 1924 its validity as part of the law of the country was recognised, and has remained in force since that date, with some few minor additions and alterations.

The transfer was effected on 1st April, 1920, when the entire organisation was overhauled with a view to its establishment as a self-supporting unit, and the port has since been administered on a commercial basis.

At the same time, an Advisory Committee was formed of representatives from commercial firms, Civil and Military Departments, which assisted the Port Director to formulate and introduce Port Rules and Regulations, By-Laws and Schedules of Dues and Charges.

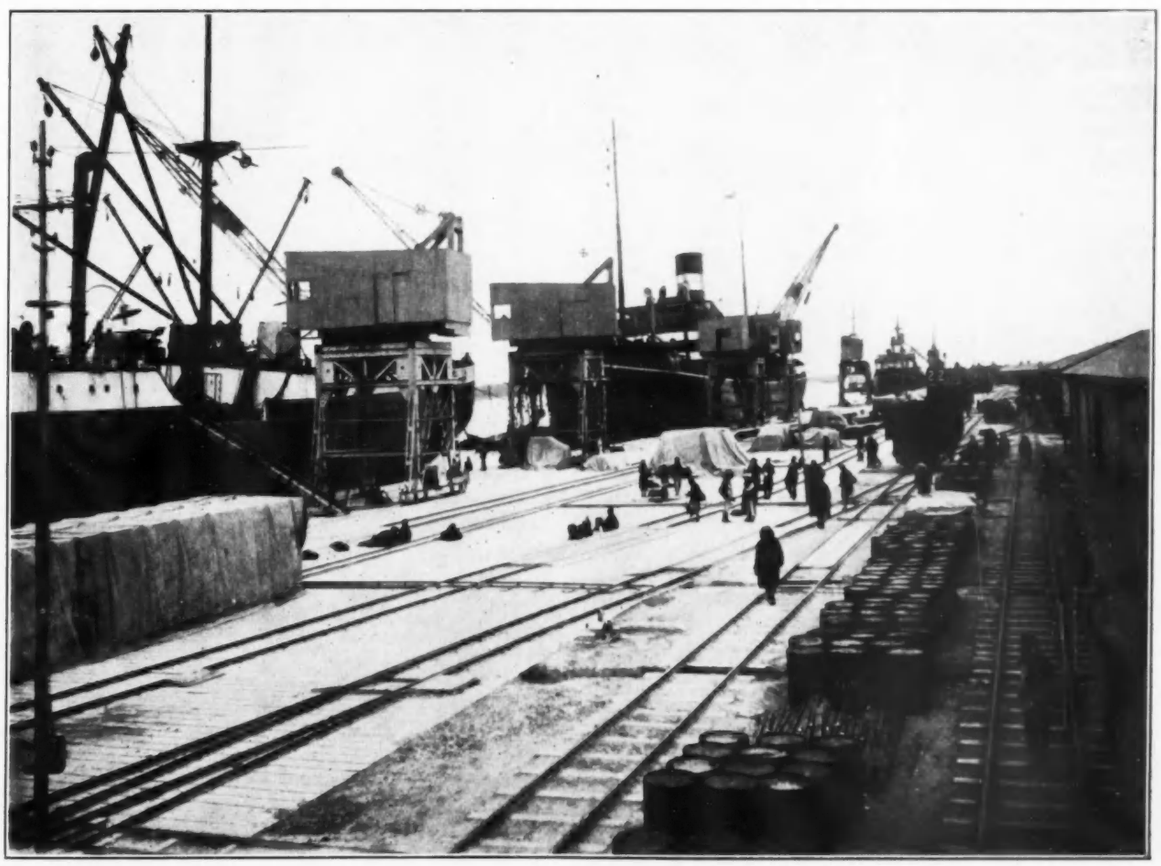
Equipment.

One of the early problems was to decide which items of equipment should be retained. There was a wide field of choice, since the military organisation had been much in excess of what would normally be required, and careful discrimination had to be exercised to avoid overburdening the port with

The Port Creek Dredger "Tawa" employed on reclamation of foreshore.

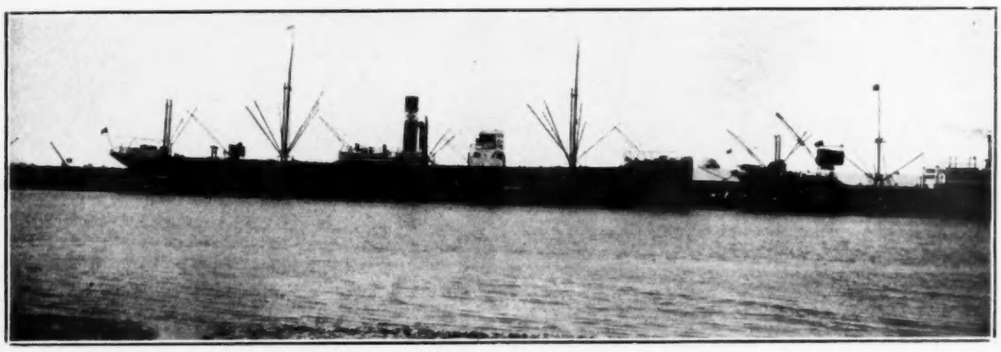
Port of Basrah

Grain Loading, Margil Upper Wharves.



General View, Margil Wharves.

Port of Basrah—continued



General view Margil Wharves from left bank of river.

unnecessary appliances. The same care was exercised in the selection of lands, buildings, wharves and craft, and experience has shown that a wise selection was made.

Much, however, remained to be done in order to complete essential requirements, particularly the construction of storage sheds and warehouses and permanent buildings.

During Military Regime all things had necessarily been subordinated to speed, cost forming a secondary consideration, and it was early seen that drastic economies were called for to bring about the financial balance. As a first step in organisation in order to bring specialised knowledge to bear on each of the many and various problems, the administration of the port was divided into four branches—the Marine, Engineering, Traffic and Finance Departments. A Port Health Department was established under the Iraq Department of Public Health. In 1932 it was transferred to the Port of Basrah Administration.

Early Difficulties.

The position of the port to-day is admittedly satisfactory. It is hardly necessary, however, to emphasise that this was not brought about in a day, but is the result of much thought and hard work on the part of all concerned, extending over the entire period during which the port has been in existence. Nor were conditions always propitious to progress; there were, in fact, many occasions when they were much the reverse, when circumstances over which little or no control could be exercised by the Port Authorities almost brought the work to a standstill. Perhaps the greatest of these was the steady opposition in the early days put up to the establishment of a regular port by a section of the commercial community themselves.

It may seem strange that such a feeling existed and that it was so strongly maintained. The explanation, of course, was that the creation of a proper port seriously affected certain vested interests. Under the Turkish regime, when only a nominal supervision was exercised by the Government and local authorities, private firms were able to load and unload as they pleased. In effect, this meant that certain firms and individuals gradually established monopolies which they operated entirely to their own profit in an unregulated and inequitable manner. The main commercial community were thus exploitable by a few lucky individuals. It was natural that the closing down of these sources of revenue to private enterprise should not be looked upon with favour by the persons affected. There was also a very general apprehension that the trade of the port could not, from an economic point of view, provide the revenue necessary to keep the port as constituted going without increasing the port dues and thereby handicapping trade. Representations under the latter head were recognised as forming a matter of paramount importance, and the fullest consideration was given to the question from all points of view, and there has been, in fact, a steady reduction in port dues.

Cargo Accommodation.

The handling of commercial cargo at first gave rise to difficulties, Military needs having hitherto subordinated all else to speed. At the time of taking over from the Military no shedding accommodation existed in the wharves transit area, all cargo previously having passed over the wharves being Army consignments, which were loaded direct into railway trucks ex-steamer for despatch to the various Military depots. In the early days of the port, therefore, goods had necessarily to be stored at considerable risk in the open, protection to some extent being afforded by dunnage and tarpaulins. The necessity for adequate shedding accommodation was quickly realised, a complete scheme drawn up, and put in hand with the least possible loss of time.

Two large sheds and certain smaller sheds were obtained locally and immediately erected, and five additional sheds of the 450 ft. by 75 ft. Brady type ordered from England. The whole scheme of shedding accommodation as then planned was completed by 1922, since when further additions have been made to meet the increasing demands of trade.

To bring the original scheme into being, called for much careful thought and strenuous labour, of which only a small proportion is apparent to the casual observer of the well-ordered conditions now existing. To mention, alone, the preparation of the ground, many thousands of cubic yards of earth filling had to be done. In carrying out this work it was found possible to combine two necessary duties, i.e., the spoil dredged from the front of the wharves to give deeper draft of water there, being used for raising the shed sites.

To meet needs since brought to light, opportunities have been taken to acquire certain additional land, craft and plant. These purchases have been made on most advantageous terms. The equipment of the port is now complete, and at a cost astonishingly small. It is correct to say that the Port of Basrah is probably one of the best-equipped ports of its size in existence.

Pilferage.

Difficulty had previously existed in preventing pilferage, necessitating the maintenance of a very expensive staff of watchmen. The provision of sheds and the enclosing of the entire transit area with a high steel fencing amongst the other benefits conferred, immensely lightened this task and enabled economies in staff to be effected, and later on arrangements were made to have the entire area policed by a comparatively small body of the regular Civil Police Force.

Top. Ellerman & Bucknall Steamer loading at Upper Wharves, Margil.

Bottom. Grain loading, Margil Upper Wharves.

Port of Basrah

Margil Main Wharves, General View.

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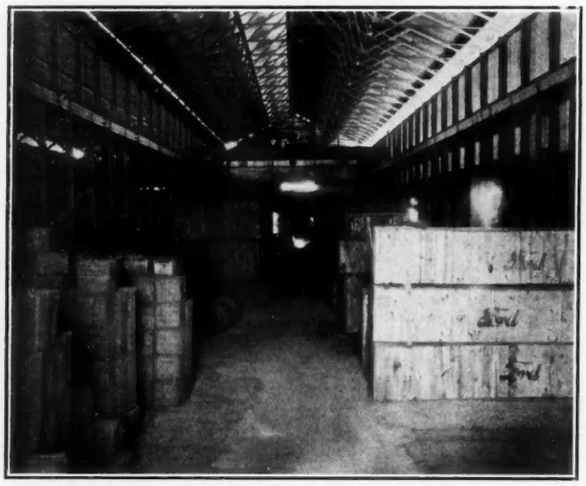
Aerial view of part of Port Transit Area showing Transit Sheds, Warehouses, etc.

Port of Basrah—continued

Financial Position

The financial position of the port is thoroughly sound. The substantial reserve, which has been accumulated from revenue, is maintained partly in liquid form to cover possible fluctuations in revenue, but is mainly utilised to finance new works. A considerable sum has already been utilised for this purpose, and a portion has always been set aside for new works to be carried out under a progressive programme of development. Provision for depreciation of capital works financed in this way has been made annually from revenue in order to maintain the reserve intact.



Bonded Warehouse for Heavy Packages—Margil Wharves. Each span fitted with a 5-ton Overhead Electric Travelling Crane.

The following is a list of the principal works which have been financed from revenue during the period under review:—

		I.Drs.
1.	Purchase of Land	55,200
2.	Extension of Grain Sief	26,026
3.	New Headquarter Buildings	26,151
4.	Rest House, Bungalows and other Buildings	53,012
5.	Segregation and Quarantine Hospital and Medical Officer's Quarters	7,079
6.	Cargo Transit Sheds	120,428
7.	Craft (various)	90,040
8.	Buoys, Water Plant, Fire Protection, etc.	46,147
9.	Jetties, etc.	11,443

Bar Dredging Scheme

It was early realised that the activities of the Port of Basrah would be seriously restricted unless a dredged channel could be made and maintained through the Bar at the mouth of the Shatt-al-Arab, over which at that period no ship drawing more than 20 ft. would pass at high water. Modern vessels trading to Iraq required from 24 to 32 ft. of water in accordance to their size and tonnage, whilst the operations of the Anglo-Iranian Oil Company in shipping oil from Abadan were severely handicapped by their inability to pass fully-laden tankers over the Bar. It was obvious, however, that the work would be of some magnitude if it was to accomplish all that was required, and guarantee free access to Basrah and Abadan of ships of deep draft.

During the War conditions did not permit of any serious or prolonged efforts being made to improve this channel, but opportunity was taken to dredge across the Outer Bar. Although the results were somewhat disappointing, the experiment showed that with specially-designed dredgers the work might be accomplished.

In 1922 the eminent firm of engineers, Messrs. Rendel, Palmer and Tritton, were called in to advise on the possibilities of a dredging scheme. The late Sir Frederick Palmer, a Past-President of the Institute of Civil Engineers, visited the port, and after consultation with the Port Director and Director-General of Navigation, Col. J. C. Ward, C. M. G., C. I. E., D. S. O., M. B. E., and study of the considerable data collected by the port over a period of five years, he issued a report advising the construction of drag suction hopper dredgers for the work.

In 1923 an agreement was accordingly entered into between the Iraqi Government and the Anglo-Iranian Oil Company, whereby the latter would provide on loan the money to purchase dredgers for the Port Directorate to make and subsequently maintain a deep-water channel through the Outer Bar. The Government agreed to introduce a special dredging due chargeable on all ships using the channel for the purpose of repaying the loan and maintaining the channel itself. The original agreement provided for the construction of a channel 28 ft. deep at high water with a width of 300 ft. Work began in December, 1924, and the new channel, now known as the Rooka Channel, was first opened to traffic in 1926 by His Majesty, the late King Faisal. The opening of this great undertaking, whereby the commercial value of the port was so greatly enhanced, constituted a most important event in the history of the Port of Basrah. The success of the venture that has since been so amply proved, testifies to the wisdom and vision of the author of the scheme.

In 1928 an agreement was reached whereby the depth of water in the channel should be increased from 28 ft. to 30 ft. at high water, which also involved dredging the Inner Bar in order to allow vessels to cross the Inner Bar, earlier on the tide, and thus enable them to take full advantage of high water in the Rooka Channel. This programme has been completed. In all, a sum of £462,010 was provided as a loan by the Anglo-Iranian Oil Company during the currency of which the receipts from the dredging dues have been sufficient to meet all expenditure on the continuous dredging service, redemption and interest charges on the loan. In 1933 the loan was completely redeemed and a reserve fund built up, sufficient to pay for a new dredger, which was delivered in June, 1935, and is now in commission, in addition to which a 25 per cent. reduction on the dredging dues was made early in 1934, and a further 15 per cent. in 1935. The entire scheme cost a million and a quarter pounds sterling, and was declared complete on the 31st December, 1930.

Dredging the Bar has converted the port from one which could only be entered by vessels of a draft of 20 ft., into one, to and from which vessels drawing 32 ft. can freely pass. An ocean steamer of ordinary size can now take her full cargo into, or ship it direct from the port, whereas under former conditions two-thirds of her cargo had to be lightered a distance of fifty to one hundred miles and transferred at sea. The extra handling risk and delay attendant on the former state of affairs were all reflected in the very high rates then prevailing for freight, insurance, etc.

The annual saving in transport costs effected by the dredged channel on all classes of cargo coming into and leaving the port up to date is estimated to be at least 2½ million sterling, whilst the annual dredging due imposed in order to finance the scheme amounts to little more than two hundred thousand pounds.

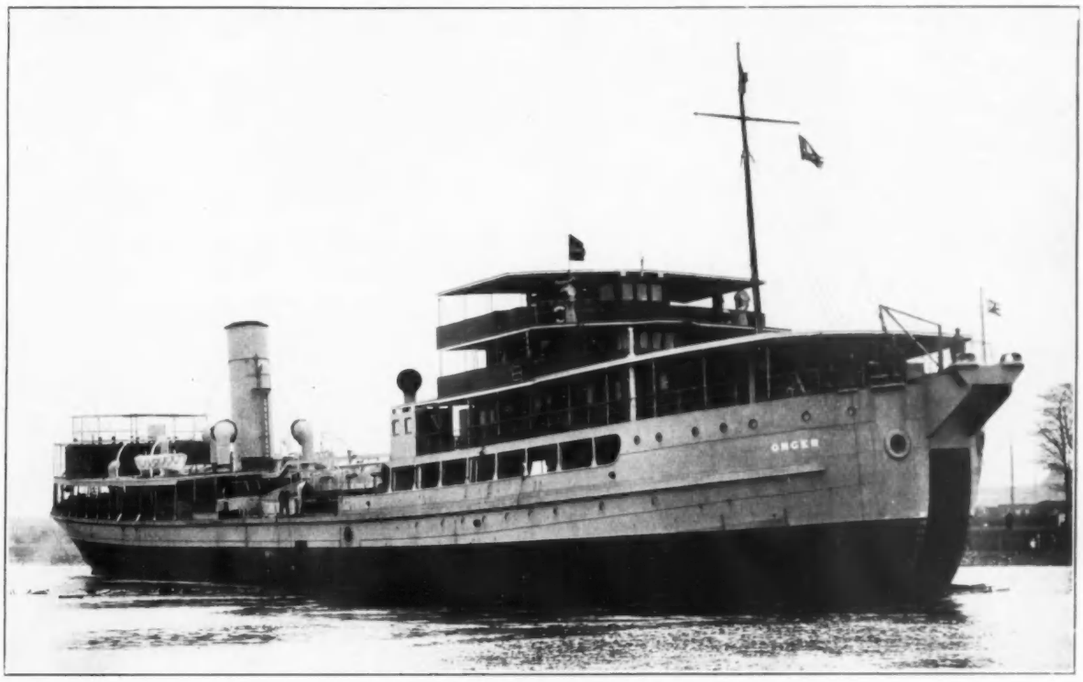
Headquarters Offices of the Port of Basrah Directorate.

The Port of To-day

The position to-day is that the port is exceptionally well favoured. The provision of all the facilities of a modern port to the commercial community of Iraq and the opening up of the Shatt-al-Arab to large ocean-going vessels has only been possible through the progressive opening up of the natural resources of Iraq, both actual and potential. But the Port Authorities can justly claim that had it not been for the foresight of its Director, who was the first to realise the significance of the Port of Basrah as a national asset and for the determination with which he carried through his plans of development, Iraq would be faced to-day with no port capable of dealing with her increased and modern trade.

It is an accepted feature that a Port Authority of to-day, to execute fully its responsibilities to the economic factors of a country, must be consistently ahead of purely current trade requirements. Despite the rapid advance made by Iraq during recent years, it is correct to say that the Port of Basrah has

Port of Basrah—continued



The "Onger," the latest dredger supplied to the Port of Basrah.

afforded undoubted advantages as the centre of trade with foreign markets, and continues to manifest its faith in the future, by the steady progress of its programme for improving facilities, and the maintenance of that state of efficiency essential to a modern port.

The policy of development being pursued in the interests of Iraq traders and producers, is to extend the port's commercial activities so as safely and economically to handle and dispose of the trade of the country, to the extent that expanding commerce will demand. There is every reason to hope that the importance of this role will increase as the country becomes more fully developed and gradually attains the full advantages of its agricultural resources.

Limits of the Port.

The limits of the port extend from the Persian Gulf at the entrance of the Shatt-al-Arab to a point upstream of Nahurumar twenty-one miles above Basrah. The control of vessels at Abadan falls within the jurisdiction of the port.

Dredging.

Navigation of the port had hitherto been limited by the depth of water on the Outer Bar at the mouth of the Shatt-al-Arab, sixteen miles seaward of Fao, which formed a great handicap to shipping. The lowering of this Bar constituted the main object of improvement of the approaches to the river, as upon the depth obtained over the Bar depended the class of vessels able to enter the river, as well as the discontinuance of the lightering of cargoes before entering or finally sailing from the port. Dredging was commenced in December, 1924, on the arrival of the first or smaller dredger "Liger," and pressed on when the second dredger "Tigon" arrived in March, 1925. Both dredgers were constructed specially for the work by Messrs. Wm. Simons & Co., of Renfrew, Scotland.

The "Tigon" is a twin screw 2,000 tons pump hopper drag dredger capable of dredging 45 ft. below water level with a speed, when loaded, of about 10 knots; length 285 ft. between perpendiculars, moulded breadth 47 ft. and moulded depth 21 ft.

The "Liger" is a twin screw 1,250 tons pump hopper drag dredger of the same description as the "Tigon," but with a length of 254 ft. between perpendiculars, moulded breadth 43 ft. and moulded depth 18 ft.

Orders were placed early in 1934 for a new dredger with the same builders as the dredgers already in commission, to be named the "Onger," which vessel was successfully launched from the Renfrew shipyard on 19th March, 1935.

The new dredger is fitted with two sets of triple expansion surface condensing engines, and steam is supplied by three cylindrical multitubular boilers with forced draught and oil-burning installation. With a dredging capacity of 2,000 tons of solids per hour, the outfit consists of a set of triple expansion engines driving a centrifugal pump coupled to a suction pipe fitted in a frame carrying a drag head. The frame is designed to dredge to a depth of 45 ft. under water. The hopper is of the dry-bottom type, with discharge by a suction pump. Special arrangements have been provided whereby material may be discharged ashore or through a floating pipe line.

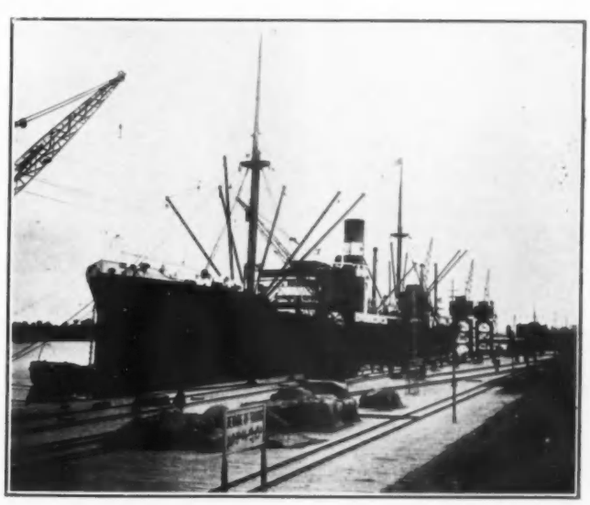
Up to the end of March, 1935, the following quantities of material had been dredged from the Bar seaward of Fao, also above Fao, including Abadan Reach, Abadan Jetties, Mohammerah Bar and Margil Wharves, namely:—

	Cubic Yards.	Tons.
Seaward of Fao	98,337,351	131,116,468
Abadan Reach	332,350	443,133
Abadan Jetties	280,784	374,379
Mohammerah Bar	1,849,042	2,465,389
Margil Wharves	293,641	391,521
Total	101,093,168	134,790,890

Before dredging operations were commenced the depth of water on the Outer Bar at high water of spring tides was only 19 ft., while now there is under the same conditions about 32 ft.

The area over which dredging operations have been carried out at the Bar measures approximately 15 miles by 300 ft. wide, and the material dredged comprises silt chiefly of a floculent nature, of which only a percentage can be retained in the dredgers' hoppers and deposited at sea, the remainder being carried overboard through the overflow with the water to settle again in the estuary.

To-day, with the careful maintenance and conservancy of the Shatt-al-Arab together with the construction and improvements of the channel, the Port of Basrah is growing in extent and importance.



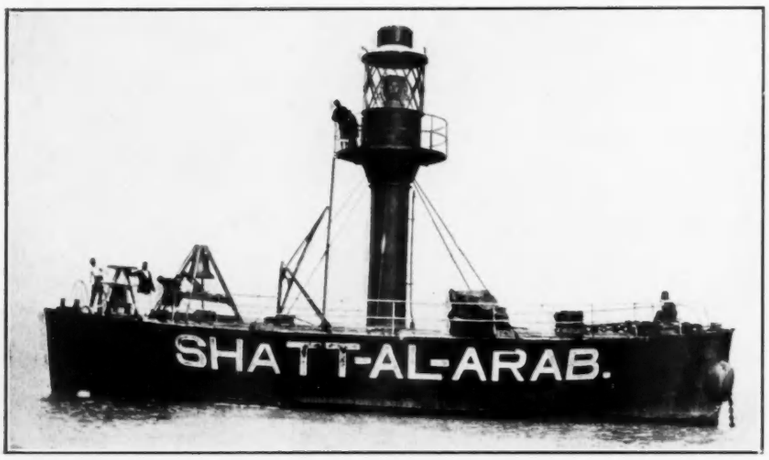
Hansa Line Steamer discharging at wharves.

Port of Basrah—continued

Navigational Aids: Buoys and Lighting.

The extensive system of lighting and buoying, etc., in the approaches to the river, the sea channels leading to the port, and in the Shatt-al-Arab, is under the control of the port. On behalf of the Government of India, the Basrah Port Directorate likewise is responsible for the maintenance of and attention to the lighthouses and lights in the Persian Gulf, which are visited regularly throughout the year by one of the port's vessels, the light tender "Nearchus," which is specially equipped for such work.

On the Outer Bar a semaphore with a night automatic registering tide guage is in operation, which indicates to vessels waiting to cross, the depth of water available. The Bar and all other points offering difficulties to navigation are carefully demarcated by leading marks and 50 modern gas Aga buoys and beacons, as well as four additional illuminated



Shatt-al-Arab Light Vessel.

automatic tide guages for the guidance of pilots. With the very adequate provision of lighting and buoyage arrangements, ships navigate the river by night as well as by day.

The whole of the buoys, beacons, lightships and the tide gauge, also a complete generating station for the manufacture of dissolved acetylene, which is used as the illuminant, were supplied by the well-known firm of Lighthouse Engineers: The Gas Accumulator Co. (United Kingdom) Ltd., of Beacon Works, Brentford, Middlesex.

Control Vessel and Surveys.

To control specially the ships passing through the dredged channel, a special control vessel is stationed at the inner end of the Bar. The Outer Bar is surveyed daily, and the whole of the main channels at regular intervals throughout the year.

Pilotage.

Pilotage is compulsory on all vessels entering or leaving the Shatt-al-Arab, with the exception of certain ships of war and native sailing craft. A steam pilot vessel in charge of a pilot master is permanently on station with a cruising ground about 24 miles to seaward of Fao, and 11 miles N.W. inward from the Shatt-al-Arab Light Vessel, which is situated 17 miles from the outer end of the dredged channel. This pilot vessel provides all incoming ships with pilots, and takes off those from outgoing vessels. Within the harbour limits at Basrah and Abadan ships are manœuvred and berthed by European harbour-masters.

The Shatt-al-Arab Water Way.

The Shatt-al-Arab during the whole of its course has a wide deep channel in which ocean steamers can, with ordinary precautions, navigate and pass each other without danger. The general depth of the navigable channel varies from 30 to 60 ft., except at Mohammerah Bar, where the Karun River joins the Shatt-al-Arab. This is a seasonal Bar, formed by the freshets from the Karun, bringing down silt before the Shatt-al-Arab is sufficiently in flood to keep the silt moving. With the opening up of the Dredging Scheme, no serious inconvenience is caused, the dredgers dealing with the situation as and when necessary, the maximum high-water depth maintained being 26 ft.

The approaches to the Port of Basrah are very picturesque, the whole course of the river running through dense date palm groves on both banks, the trees and foliage creating a setting difficult to surpass in beauty. These date belts, extending well inland from the river, are irrigated by a vast number of canals or creeks.

The frequent reference made to Basrah as the "Venice of the East" is attributable to these silvan creeks, whose still waters reflect the splendour of the beauty that adorns their banks, under the canopy of the bluest of skies; likewise to the bellum or local craft that navigates these waters which is very similar in appearance to the Venetian gondola itself.

Fao Depot.

At Fao, which lies on the right bank near the entrance to the river some five miles above the Inner Bar, there is a branch office for the collection of dues on sailing craft which do not proceed as far up river as Basrah. This station is also the base for the dredging operations, including the repair shops, stores, hospital, oil and fresh-water supplies, as well as the site of the Gas Plant erected for generating gas for the illuminated Aga buoys and beacons. The close proximity of this base to the actual site of the dredging has allowed operations to be carried on continuously with few interruptions, and then only of short duration, and what was previously a low-lying swampy area has developed into a very well laid out and active station. In addition, there is a Customs post, and important salt pans. Fao is also the station of the Indo-European Telegraph Department, where the sea cable from India joins the land telegraph line.

Abadan.

Abadan, the ever-growing Oil Port, lies thirty-one miles above Fao, on the left bank, at which place the refineries and works of The Anglo-Iranian Oil Co. are situated. There are ten jetties at which tankers are berthed for the export of oil, and one wharf for cargo vessels to discharge stores and materials. Exports of crude oil and its products from Abadan approximate 7 million tons per annum.

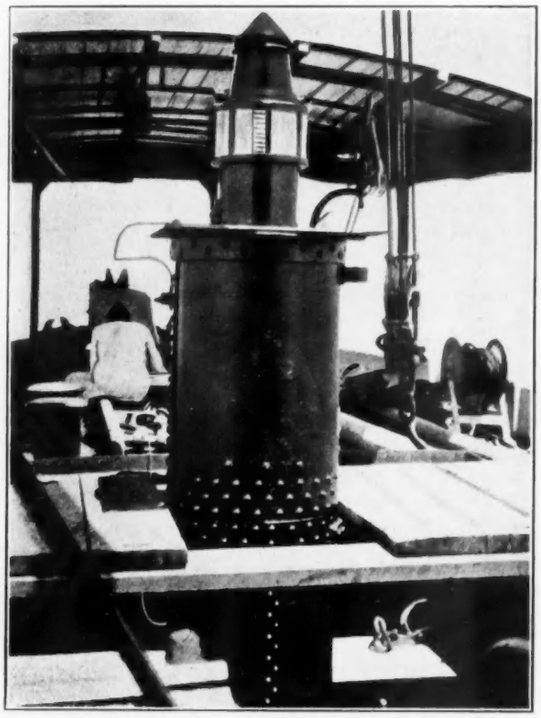
A floating dry dock is maintained at Abadan by the Anglo-Iranian Oil Co. for effecting repairs to craft and has a maximum lifting capacity of 750 tons.

Mohammerah.

Mohammerah is also situated on the left bank forty-four miles above Fao. Cargo ex-ocean steamers to and from Iran is here handled by means of "Lighters" in the open river.

Margil, Basrah.

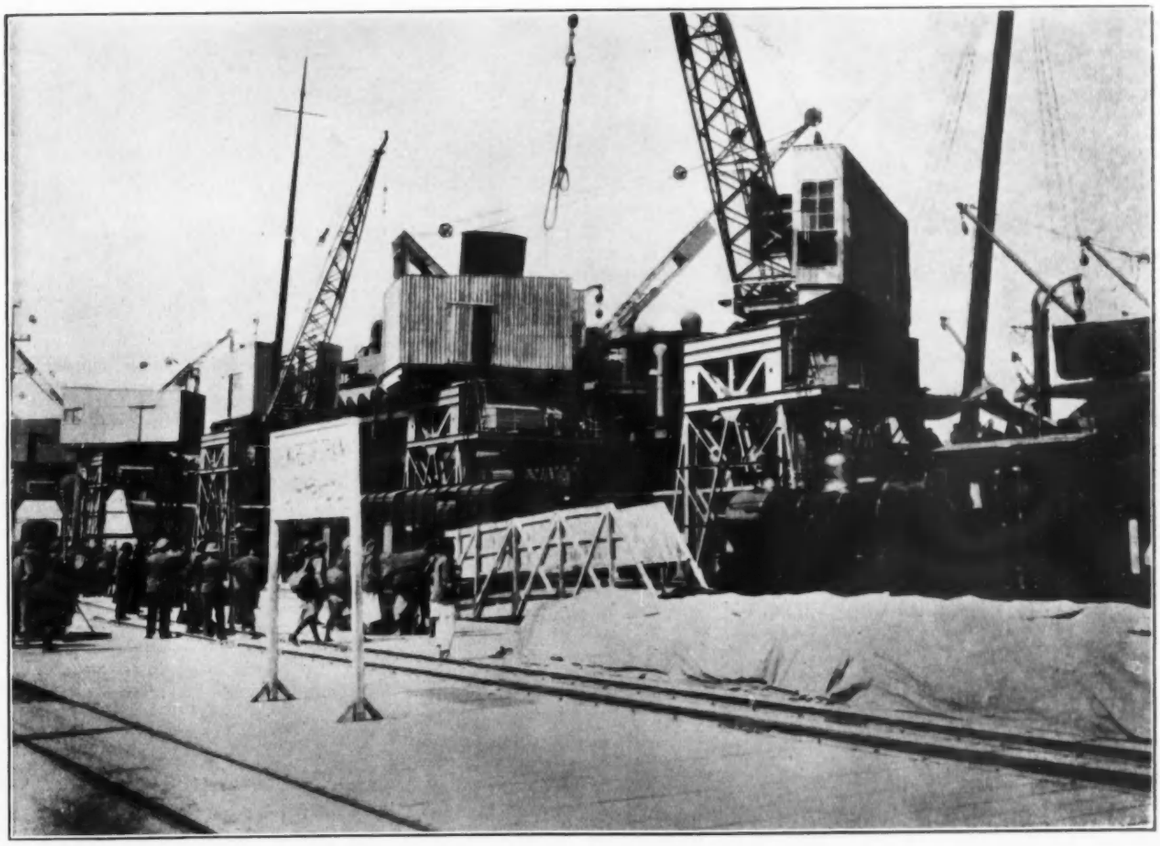
Sixty-four miles above Fao on the right bank at Margil lies the war-time, and now commercial Port of Basrah, whose wharves comprise eight permanent berths and four temporary



Rooka Channel Beacon, Basrah.

Port of Basrah

General View, Margil Wharves.



General View, Margil Wharves.

Port of Basrah—continued

berths for ocean steamers, with equipment well found and up to date in all respects.

Nahurummar.

Seventeen miles above the Port of Basrah (Margil) and eighty-five miles above Fao lies Nahurummar, formerly a War port of importance, but now shut down on the concentration at Margil.

Basrah Harbour.

The limits of the harbour of Basrah extend to Margil, five miles up stream of the the town proper, where the deep sea wharves and the main estates of the Port of Basrah are situated. The whole of the public wharves and jetties are controlled by the Port Authorities.

Top. Grain Loading into Native Craft, Margil Jetties.
Bottom. Native Craft at Margil Jetties for Grain Loading direct from rail.

The Port Area.

The Margil Estates of the Port of Basrah cover an area of over 1,500 acres. The extent of the land originally acquired received the most careful consideration, the desire naturally being that the volume of normal trade could only carry a limited capital liability. At the same time, due regard to probable future expansion had not to be overlooked, likewise the opportunity then offering was one which could not be expected to be repeated. The policy has since proved to have been a very sound one, the area having enhanced in value beyond all expectations. In addition to the normal activities of the port it has been found possible and advantageous to all interests, to lease a large area to the Iraq Railways Authorities, whereby the terminus of the Basrah-Baghdad railways is now situated within the port area adjacent to the main wharves. For similar reasons it has been decided to construct the new Basrah Air Port within the estate, still leaving ample space for future developments in dock construction, which the progress of the country might early require.

Administrative Offices.

The Administrative Offices of the port are situated in the Headquarters Buildings overlooking the main wharves at Margil. The Administration is vested in the Port Director and Director-General of Navigation, and divided into five departments, namely:—Marine, Traffic, Engineering, Finance and Port Health.

The new Headquarters Buildings, which was completed and opened by His Majesty the late King Faisal in March, 1931, is a magnificent structure. In length 250 ft., width 70 ft., height from road level to the top of its deep-blue tiled dome 66 ft.

The main hall is 34 ft. square, with office accommodation of 13,500 sq. ft. The building is of an extremely handsome design and sound construction, befitting the dignity of an institution like the port.

Main Wharves.

The main wharves are constructed of teak wood, the total length of continuous jetty is 5,000 ft., providing berthing accommodation for eight or more ocean steamers. In addition, there are three separate berths for ocean steamers, situated at the Port Grain Exporting Areas, upstream of the main wharves, for the direct loading of bulk grain into ocean steamers. Depth of water alongside at low water is 25 to 29 ft.

Transit Area.

Adjacent to and running parallel with the main wharves is the Transit Area, an area of 30 acres, with covered and open storage accommodation capable of amply dealing with present needs and so designed as to easily permit of extension. The area is directly served by an ample and carefully-planned layout of railway sidings, connecting with large marshalling yards in close proximity to the main wharves, and in direct connection with the Iraq railways system to Baghdad and the North of Iraq. The whole area is securely enclosed by high steel fencing.

Transit Sheds.

The Transit Area is provided with seven Transit Sheds with a ground area of 230,000 sq. ft. for import and export cargoes. A high standard has been set in the construction and appointment of these sheds, which serve the main wharves, and embody the last word in practical efficiency. The river-side face of the sheds is set back 100 ft. from the edge of the wharves, in order to give access to three railway lines, situated immediately behind the crane track running along the front of the wharves.

Within the controlled premises of the port there is storage accommodation for about 120,000 tons of cargo, and some 200,000 tons of grain.

Cranes.

The main wharves are equipped with fifteen electric travelling cranes, five with a lifting capacity of 1½ tons, eight with a lifting capacity of 3 tons, and two with a lifting capacity of 8 tons. These cranes are available for the discharge or loading of cargo from and into steamers or for delivery of goods to rail, or into local craft. There are also three steam cranes with a lifting capacity of 5 tons each within the Transit Area for loading of local craft or rail wagons, also one hand crane of a similar capacity.

Warehouses.

Immediately behind the Transit Sheds and within the Transit Area are situated eight warehouses, separated from Transit Sheds by sufficient space to accommodate two lines of railway tracks; one to serve the rear of the Transit Sheds and the other the warehouses, which run parallel with the Transit Sheds. Five of the warehouses are fitted with overhead travelling cranes, one of 3-ton capacity, three of 5-ton capacity and one of 10-ton capacity, whereby covered storage is available for machinery packages, motor cars, etc., direct delivery to rail, river or road being possible without any risk of damage due to man-handling. The average size of these warehouses is 300 ft. by 120 ft., and the total ground area of the warehouses amounts to 150,000 sq. ft. The warehouses available for all classes of storage accommodation are so erected as to facilitate the transfer of goods therein, with the minimum amount of handling and inconvenience, whether the goods are received from the Transit Sheds or outside. Separate accommodation is included for "Bonded" and "Duty Paid" cargo, and for import cargo lying "In Transit" but uncleared. There are specially sited warehouses for cargo of a hazardous nature under either of these categories.

The storage is particularly convenient for goods landed from vessels discharging at the wharves in view of the saving effected in transport costs. The rates of storage are remarkably low, particularly as the warehouses of the port present features striking and exceptional in a port of this size.

Grain Siefs.

A complete Grain Sief with berths for direct loading of ocean steamers or into lighters is situated upstream of the Margil Main Wharves, where it is possible to store up to 200,000 tons of grain. Direct loading into ocean steamers of over 2,000 tons bulk grain per 24 hours at each berth is possible at these siefs. The Grain Siefs consist of a large plot of ground immediately adjacent to the Transit Area, levelled, drained, cambered and divided into 30-40 plots measuring 300 by 150 ft., each with a railway siding for direct rail service. Each sief being situated on the river front, there is direct access for loading or unloading craft. At present all grain at the siefs is man-handled; the time, however, is not far distant when more modern means will require to be introduced, the installation of which is being carefully borne in mind. With the completion of the vast irrigation schemes now in hand in the country, it is fully anticipated that this trade will considerably develop.

Port of Basrah—continued

Police Services and Fire Protection.

The port maintains its own Police establishment, a section of fifty men of the Iraq Police Force with a station at the main wharves gates. A fire brigade, fully equipped with modern fire engines and fire floats, is also maintained. The entire transit area and its approaches are served with a 7-in. water main and numerous hydrants fed by powerful pumps capable of supplying 100 lbs. pressure at all hydrants simultaneously at a minute's notice.

Labour.

All labour at the Port of Basrah main wharves is supplied by the port.

Quick Despatch.

With its modern equipment, capacious storage accommodation and ample safeguards against all contingencies, the Port of Basrah is able to undertake the landing, shipping and warehousing of cargo of all categories expeditiously and economically. As an example of quick despatch, the weekly fast mail steamer with Bombay may be instanced. These steamers having to run to scheduled time, have of necessity to remain in port only for a maximum period of 48 hours, during which a total of anything up to 4,000 tons import and export cargo is handled.

Floating Cranes.

A floating self-propelled crane with a maximum lifting capacity of 30 tons, and a sheerlegs with a maximum lifting capacity of 85 tons, are available for use, where exceptionally heavy articles have to be dealt with.

Sheerlegs "Goliath," 80-tons lifting capacity.

Berths in Stream.

All ocean-going steamers are berthed at the Margil wharves for the discharge of imports, and in a number of cases also to load export. There are also a considerable number of moorings provided in stream within the limits of the harbour. The river moorings are used by steamers loading cargo overside from lighters. In this connection there is a very big lighterage business in the port. With grain and date exports the larger proportion is shipped in the stream, and only a comparatively small tonnage over the main wharves.

Oil and Inland Water Craft Jetties.

At Muftieh, situated roughly half-way between Margil and Ashar, special wharves exist, reserved exclusively for the handling of petrol, kerosine and oil fuel. At the entrance to the Ashar Creek, which runs through the City of Basrah, and forms its main means of transport, Viceroy's Pier, a substantial modern jetty of 18,440 sq. ft. in area, is provided. These wharves are suitable for and busily used by numerous inland water vessels (steam, motor and sailing) trading to Baghdad and other intermediate riverain ports. Depth of water does not permit of its use by ocean steamers. A number of less important subsidiary wharves and jetties exist at various points.

Wireless Communication.

The Port Headquarters is in communication by radio telephony and wireless telegraphy with all the out-stations of the port, including the pilot vessel, control vessel (dredged channel), dredgers, repair depot and base at Fao, survey craft and salvage vessel, as well as the port offices at Abadan.

Telephones.

In conjunction with the Post Office Authorities, "Ship to Shore" telephone facilities have been installed at each berth at the main wharves, connecting up with the efficient and modern post and telegraphs automatic telephone system.

Bunkers, Stores and Ship Repairs.

Fuel oil and lubricating oil are obtainable from the Anglo-Iranian Oil Company's oil installations at Abadan. Small quantities of bunker coal only are available at Basrah. Facilities for certain repairs are afforded at the dockyard of The Mesopotamia Persia Corporation, Ltd., the local Agents for the British India Steam Navigation Co. and other well-known shipping lines.

Dues and Charges.

Dues and charges have been steadily reduced, varying in reductions from 25 per cent. to as much as 90 per cent. since the opening of the port in 1920. In this matter of charges the position may be regarded as a most satisfactory one, when it is remembered that all development and maintenance is financed out of port earnings, and has been brought about by the strictest conservancy of funds as well as a continued regard to reduction in expenditure effected by a series of comprehensive entrenchment campaigns.

Commerce of the Port

Basrah is the commercial gateway to Iraq connected up by various ocean routes with all parts of the world, and constitutes the natural distributing centre for overseas supplies.

Ocean Passenger Traffic.

At the main wharves extensive accommodation is provided for passengers and the quick handling of mails. It is equipped with Customs and Medical Examination Rooms, and Post and Telegraph Office. A modern "fully" licensed and comfortably equipped hotel is situated close to the Terminus Railway Station, both of which are immediately adjacent to the wharves.

Daily trains connect with arriving and departing steamers, and coaches are frequently placed actually alongside the steamer.

During the year 1934/35 approximately 17,000 passengers disembarked and embarked at the port wharves. With the opening of the overland motor route to the Mediterranean (Baghdad-Damascus) some years back, quickly followed by the through rail route (Baghdad-Mosul-Istanbul-Calais), and the ever increasing air traffic, the number of saloon passengers passing to and from Iraq through the port ex-ocean steamers has somewhat diminished.

Iraq as a Tourist Centre.

Tourist traffic to and from India and the Far East, however, show signs of increase, the many routes of travel to Europe via Iraq presenting definite attractions to tourists. The country itself offers a great variety of interests to the traveller, who can now visit in great comfort a large number of historic cities which still live and flourish as well as a host of dead towns and ancient sites of archæological interest. Babylon, Kish, Nineveh, Asshur and Ur are all as easy of access as they are full of interest to all lovers of the past.

A steady pilgrim traffic from India passes through the port on visits to the Holy Cities of Iraq, to which all facilities are offered during the passage through the port.

Overseas Communications.

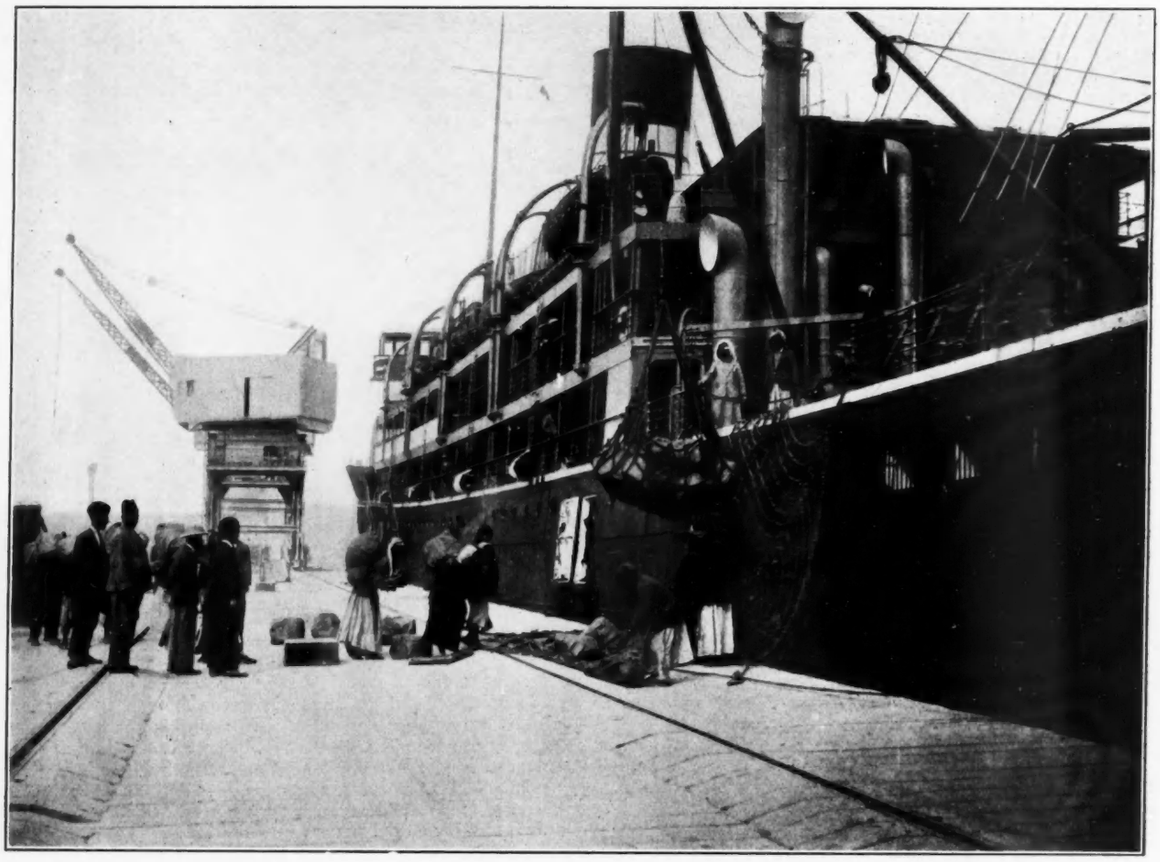
The great expansion of trade passing through the port is strikingly evident, when the total tonnage of ships entering the port in pre-war days amounting to approximately 100,000 tons only is compared with the position of to-day.

During the year 1934/35, 930 merchant ships representing a gross tonnage of 5,368,819 tons entered the Port of Basrah. The trade of Iraq is varied and carried in steamers of several important lines (the regular callers are briefly referred to below), in addition to which a number of foreign ships from all parts of the world call periodically.

Steam Vessels.

The British India Steam Navigation Company maintain a regular weekly fast mail passenger service to Bombay via Mohammerah, Bushire and Karachi, connecting to Bombay with the Peninsular and Orient Mail Services to England, Australia, South Africa and the Far East. The same Company also run a weekly subsidiary mail and passenger service via Persian Gulf Ports to Karachi and Bombay. In both cases the fleet of steamers in operation have a very high standard of passenger accommodation and provide a very good table.

Port of Basrah



A B.I.S.N. Coy's Steamer loading dates. Margil Wharves.

Typical Transit Shed with Import Cargo. Margil Wharves.

Port of Basrah—continued

A regular and direct cargo service to the United Kingdom and the Continent is efficiently carried out by the Strick and Ellerman Lines, calling at Red Sea, Egyptian ports, Marseilles, etc. These vessels afford accommodation for a limited number of passengers. During the date export season steamers of this line carry direct cargoes to the United States.

An excellent and regular cargo service is also maintained by the Hansa Line to German and Continental ports, including Antwerp, Rotterdam, Hamburg, Bremen, etc., by steamers of a high order and in which limited passenger accommodation is also available.

Self-propelled Floating Crane "Pahlwan." 30-tons lifting capacity.

The Lloyd Triestino Line with steamers arriving about once a month maintain a direct cargo service to Italian and Adriatic ports, calling at Haifa, Beyrouth, Cyprus and many Mediterranean ports. The service is effected by modern and comfortable steamers affording passenger accommodation.

Direct cargo services with Japan and the Far East are also maintained by steamers belonging to the Nippon Yusen Kaisha and the Peninsular and Oriental Steam Navigation Companies.

In connection with the activities of the Anglo-Iranian Oil Company, the British Tanker Company run an up-to-date fleet of tankers carrying oil products from Abadan to the United Kingdom, the Continent, India and many parts of the world. These tankers are very modernly equipped and maintain a very efficient service.

Vessels under the flags of the nations of Norway, Sweden, Denmark, Greece, Soviet Russia, and Japan are also frequently to be seen in port.

Sailing Craft.

In addition to steam vessels a large trade is conducted through the port by means of sea-going sailing craft. Their main trade is with the Persian Gulf ports, the West Coast of India, Zanzibar, etc. There is a great variety of this craft, known as Dhows, Sambooks, Booms, etc. During the date season a very large fleet of these vessels with their high sterns, quaint lines and steep masts may be seen in port, and present a very picturesque setting. The design of these vessels has remained unchanged since the days of "Sindbad the Sailor," and although present day transport requirements may deplete their number, it is hoped that these old world craft that have survived the test of centuries, will ever retain their share of the navigation and merchant ventures of the Persian Gulf, and its waters.

The total number of sailing vessels entering the port during the course of a year averages between 5,000 and 6,000.

Inland Transport

Rail.

The main wharves are equipped with railway sidings connecting up with the main system of the Iraq Railways, whose operations extend to Baghdad, the far North, and many parts of the country, also to the Iranian Frontier in the N.W., by which route a considerable transit trade with Iran is maintained.

River.

The Rivers Tigris and Euphrates offer every facility for water transport. A large fleet of river steamers owned by the Euphrates and Tigris Steam Navigation Company, Mr. Abdul Jabbar Khedery and other companies, regularly ply on the Tigris to Baghdad and the various riverain ports; they are available for passengers and merchandise. Cargo ex the main wharves or direct ex-ocean steamers is handled by this traffic which, in conjunction with the railway services, effectively serve the agricultural, industrial and consuming districts that fall within the economic area served by the port.

There are also varied types of country craft forming the every-day river life among the waterways of Iraq from sailing vessels or mahailas, to bellams or "Sennacherib" gouffas, which like their sister vessels that plough the high seas, remain very little changed from the craft, that plied in these waters some two thousand years ago or more.

Road.

The passage of all road transport is assisted at the main wharves for the direct handling from either of the transit sheds or warehouses, which completes an ideal system of distribution by rail, road or water-ways to the other large centres.

Registration and Survey of Inland Water Craft.

The Port Authorities on behalf of the Government operate a separate department dealing with all Inland Water Navigational matters, which is controlled by the Director-General of Navigation (i.e., the Port Director). The services cover the registration and survey of all inland water craft of 10 tons and upwards; the licensing of crews and navigational matters in general.

Imports.

Imports are chiefly from the United Kingdom, Germany, France, Italy, India and Japan. The principal items of import consist of building material, tea, sugar, piece goods, timber, cement, machinery. It is satisfactory to observe that the imports of constructional material have of recent years been very high, due to the opening-up of the oilfields in the North, and other industrial projects, as well as the large building schemes and town development that have been in operation at Baghdad and other large cities. The principal items of imports are as follows:—

Section of Stores and Yard at Fao Depot, the base for the Dredging Operations at Outer Bar, etc.

PRINCIPAL IMPORTS.

Commodity	1930/31 Tons	1931/32 Tons	1932/33 Tons	1933/34 Tons	1934/35 Tons
Beer	3,373	2,387	1,856	2,212	1,825
Cement	15,615	8,662	16,002	22,213	29,597
Coal & Coke	10,321	9,772	13,295	7,525	10,433
Crockery	901	536	1,646	3,083	2,610
Drugs & Chemicals	1,490	1,321	2,137	2,531	2,845
Glassware	1,199	1,168	1,852	1,887	2,478
Gunnies	1,813	1,469	1,228	1,552	1,584
Haberdashery	709	860	532	1,870	2,603
Hardware	12,383	5,837	54,019	32,365	41,983
Iron & Steel Plates, Bars, etc.	8,340	5,217	15,123	3,919	3,638
Machinery	5,002	2,001	3,007	7,192	3,810
Matches	2,084	2,079	1,872	2,018	2,148
Motor Cars	1,001	439	874	1,841	1,785
Oils (Various)	5,312	4,643	4,788	4,119	6,920
Paper	2,082	2,617	2,615	3,509	3,925
Piece Goods Cotton	14,390	16,363	18,087	20,225	22,287
Piece Goods Silk	458	1,205	869	439	392
Provisions	2,663	2,072	2,405	2,073	2,519
Shooks (date boxes)	12,481	10,665	18,370	10,836	12,083
Soap	2,288	1,240	1,432	1,615	1,546
Sand and Stones	3,597	3,573	5,674	4,667	7,053
Sugar	41,970	37,615	32,542	48,316	30,773
Tea	11,166	11,559	5,917	7,360	6,653
Timber	20,045	3,709	28,801	16,300	20,251

Port of Basrah—continued

Exports.

Basrah is an extensive date market. The importance of the date industry can be readily understood, when it is realised that the area is responsible for approximately 85 per cent. of the world's supplies. Most of the dates are exported to the United Kingdom, and other European Countries, the United States, Australia and India. As a result of marketing efforts which have been launched in recent years, there is a definite tendency of a greater opening up of these markets in the near future.

Barley, wheat and other cereals represent another of the important exports of Iraq and a very steady trade is maintained with the United Kingdom and the Continent of Europe. With the completion of the irrigation projects now in hand, combined with the considerable attention that is being given to the grading of all crops, etc., it is fully anticipated that an early rapid development with this trade is forthcoming.

Other important items of export are wool, hides, liquorice root and cotton. Horses are also exported annually in considerable numbers to India, ranging from animals required for purposes of racing, etc., down to those for normal transport uses. The principal exports are as follows:–

PRINCIPAL EXPORTS.

Commodity	1930/31 Tons	1931/32 Tons	1932/33 Tons	1933/34 Tons	1934/35 Tons
Hides and Skins ...	1,276	1,054	970	3,012	1,381
Liquorice Roots ...	4,450	3,556	7,993	9,205	4,668
Dates	153,233	166,330	162,863	117,306	184,109
Cotton	524	284	65	704	537
Tobacco	87	74	419	102	109
Grain	204,968	260,678	124,877	163,841	303,109
Wool	4,530	5,388	2,659	4,060	3,953

Miscellaneous Plant and Services

Tugs, Lighters, etc.

The Port of Basrah owns two steam tugs, two fire-floats and mooring craft, as well as a Clayton Disinfectant Barge for the fumigation of ships, and has available a fleet of steel harbour lighters and pontoons.

Salvage Equipment.

The Salvage equipment of the port consists of a complete diving unit, two salvage lighters capable of lifting a dead-weight of 600 tons, and a powerful oil-burning salvage steamer, the "Aid.' This vessel is fitted with three salvage pumps having a capacity of 800 tons per hour. The equipment comprises two 8-in. and one 4-in. centrifugal pumps; a fire pump with connections for six hoses in use at the same time; also an efficient crane with a lifting capacity of 15 tons at a 30 ft. radius and fitted with grabbing apparatus, steam windlass, and powerful steam winch.

Fresh Water.

Fresh water is obtainable from the port, and is supplied to steamers by the Directorate from water barges.

Marine Dockyard.

At Jubailah, situated between Margil and Ashar, a complete marine dockyard is maintained, comprising stores, workshops, etc., which deals with the regular maintenance and repairs of the whole of the port's fleet, and mechanical appliances, etc. The river frontage is extensive, providing a number of berths for the bigger units of the fleet, with adequate slipway accommodation for smaller craft.

Port Health and Medical Services.

The entire port area is under the Sanitary jurisdiction of its own Medical Staff, which consists of a Port Health Officer and a Port Surgeon and Medical Officer, assisted by the necessary staff of Sanitary Inspectors.

In addition to a well-equipped segregation area near the main wharves, there is also in existence at present a hospital run in conjunction with the railway to which an operating theatre is about to be annexed for the purpose of dealing with grave emergencies and minor surgery of all kinds. A motor ambulance is also available at the main wharves' entrance to deal with " Sick " and "Accident " cases.

A wider Sanitary Scheme is now under contemplation which envisages the examination of all ocean-going vessels and sailing craft at Fao, this being the point of entrance to the Shatt-al-Arab. Hitherto, such examination has been carried out at Margil, and for this reason it has been restricted only to vessels proceeding to Basrah, but, under the scheme in view, all vessels will be boarded at Fao, and granted pratique there. At the same time, strict supervision will be applied at Abadan Reach and throughout the Shatt-al-Arab. With the rapid developments which are now taking place at Fao and the sanitary measures which it is proposed to institute, the present hospital accommodation and other medical facilities will, of necessity, have to be extended and, as a natural consequence, the medical staff will also have to be increased to cope with the necessary work.

A small hospital is now in existence at Fao to deal with ordinary cases, but this will in due course be extended and a Segregation Area will also be provided and set aside for " Quarantine " purposes.

Electricity Supplies.

The port possesses its own power station, which not only meets the various requirements of the port's operations but supplies current for the whole of Basrah. Bulk supply is given to the Municipality, the British Forces in Iraq and other consumers, and the distribution of electricity in the Municipal Area carried out by the technical staff of the port on behalf of the Municipal Authorities. The new power house has been erected at Jubailah near the port workshops and depot, and was completed and carried the full load in March of last year, when the old Power House Station, erected by the Army authorities during the war, was closed down.

The new generating sets were constructed by Messrs. Ruston and Hornsby, Ltd., of Lincoln, and are of the vertical diesel oil type, connected to alternators manufactured by the Lancashire Dynamo and Crypto, Ltd., with a total output of 1,065 K.W. The current is generated at 400/440 volts, and the generators are connected direct to Ferranti Step-up transformers, which raise the pressure to 3,300 volts for transmission purposes to the main switchboard, which is one of the double bus bar type manufactured by Messrs. Allen, West and Co., Ltd. The main switchboard is of the most modern type and totally enclosed and more or less fool-proof and dust-proof.

Water Supply.

The port for its own estates maintains a water supply and having the requisite technical staff available, it was recently decided by the Government, that the port should be entrusted with the Basrah and Ashar Water Supply with a view to the amalgamation of the supplies to Basrah, Ashar, Railways and Port, also to connect up out stations. The erection of a Central Water Supply Station of the latest design, adjoining and taking motive power from the new power house, was considered justification for the more economical and improved services that will thereby result. The scheme is a very extensive one, and is under active consideration, and it is hoped will be put into active effect at a very early date.

STEAMERS ENTERING THE PORT.

Year	BASRAH No. of Steamers	BASRAH Gross Regd. Tonnage	ABADAN No. of Steamers	ABADAN Gross Regd. Tonnage	TOTAL No. of Steamers	TOTAL Gross Regd. Tonnage
1920/21 ...	428	1,483,819	180	858,404	608	2,342,223
1921/22 ...	304	1,146,562	275	1,466,246	579	2,612,808
1922/23 ...	209	782,561	321	1,799,294	530	2,581,855
1923/24 ...	221	818,384	415	1,957,668	636	2,776,052
1924/25 ...	188	758,218	413	2,438,828	601	3,197,046
1925/26 ...	194	757,671	487	2,798,929	681	3,556,600
1926/27 ...	162	674,175	506	3,047,114	668	3,721,289
1927/28 ...	171	709,457	530	3,289,447	721	3,998,904
1928/29 ...	168	714,116	560	3,383,580	728	4,097,698
1929/30 ...	173	799,189	643	3,587,778	816	4,512,132
1930/31 ...	171	741,064	648	3,868,194	819	4,609,258
1931/32 ...	176	744,722	617	3,831,834	793	4,606,556
1932/33 ...	174	762,846	638	3,975,800	812	4,738,646
1933/34 ...	174	799,033	707	4,556,086	881	5,355,119
1934/35 ...	197	892,401	733	4,476,418	930	5,368,819

CARGO TONNAGE.

Year	Imports Tons	Exports Tons	Total Tons
1920/21	455,028	7,256	462,284
1921/22	273,259	66,416	339,675
1922/23	206,317	305,972	512,289
1923/24	181,879	393,118	574,997
1924/25	206,584	245,979	452,563
1925/26	246,941	177,709	424,650
1926/27	196,023	212,341	408,364
1927/28	217,301	406,714	624,015
1928/29	222,784	275,487	498,271
1929/30	252,305	316,759	569,064
1930/31	207,665	400,630	608,285
1931/32	159,631	459,855	619,486
1932/33	263,506	320,124	583,630
1933/34	259,187	326,731	585,918
1934/35	254,709	531,196	785,905

NOTE:—The tonnage figures given in the foregoing table do not include cargo imported direct into, or exported direct from the Iranian Ports of Mohammerah and Abadan, although these cargoes are conveyed through the Port of Basrah, and all navigational services supplied to vessels conveying them are rendered by the Port of Basrah. The export of oil and oil products alone from Abadan has risen to approximately 7,000,000 tons per annum.

Port of Basrah—continued

REVENUE AND EXPENDITURE.

Year	Revenue	Expenditure	Gross Surplus	Service of Capital Debt	Works Expenditure	Nett Surplus	Expenditures on Capital Works	Depreciation of New Assets
1920/21	543,232 000	418,080 000	125,152 000	———	106,077 000	19,075 000	———	———
1921/22	365,225 000	307,471 000	57,754 000	———	38,298 000	19,456 000	———	———
1922/23	289,796 000	176,214 000	113,582 000	———	91,839 000	21,743 000	———	———
1923/24	251,876 000	166,035 000	85,841 000	44,630 000	28,949 000	12,262 000	———	———
1924/25	252,740 000	165,603 000	87,137 000	44,171 000	13,561 000	29,405 000	———	———
1925/26	260,852 000	180,917 000	79,935 000	43,270 000	16,620 000	20,045 000	———	———
1926/27	244,429 000	179,520 000	64,909 000	42,368 000	5,275 000	17,266 000	19,031 000	———
1927/28	279,844 000	202,075 000	77,769 000	41,467 000	4,168 000	32,134 000	20,285 000	———
1928/29	250,147 000	196,398 000	53,749 000	40,566 000	3,398 000	9,785 000	29,010 000	1,944 000
1929/30	282,665 000	193,584 000	89,081 000	39,664 000	4,765 000	44,652 000	7,523 000	2,278 000
1930/31	259,212 000	197,965 000	61,274 000	38,763 000	7,560 000	14,924 000	43,347 000	2,528 000
1931/32	228,976 000	170,322 000	58,654 000	37,861 000	2,754 000	18,039 000	5,435 000	4,011 000
1932/33	243,956 000	163,569 000	80,387 000	36,960 000	4,540 000	38,887 000	23,417 000	4,154 000
1933/34	275,400 000	173,042 000	102,358 000	36,058 000	9,328 000	56,972 000	26,106 000	4,935 000
1934/35	297,744 000	211,434 000	86,310 000	35,157 000	10,968 000	40,185 000	6,207 000	5,805 000
TOTALS	4,326,094 000	3,102,229 000	1,223,865 000	480,935 000	348,100 000	394,830 000	180,361 000	25,655 000

31st March, 1935.

GENERAL RESERVE	LDrs. 225,000 000
SURPLUS REVENUE RESERVE	„ 133,385 000
	LDrs. 358,385 000

North-East Coast Notes

Tyne Trade Figures.

At the July meeting of the Tyne Improvement Commission the Docks and Trade Committee reported that in the six months ended June 30 the quantity of coal and coke shipped was 6,643,997 tons compared with 7,022,488 tons in the corresponding period last year, a decrease of 378,491 tons. Bunker coal shipments in the past half-year were down 160,345 tons on 1934. At the Commissioners' Docks and staiths the decrease was 186,067 tons. Oil fuel bunkers were up 4,390 tons on the half year. The Lord Mayor (Councillor R. S. Dalgliesh), in submitting the report of the Trade and Commerce Committee, said it was disappointing to find that there was a decrease of nearly 400,000 tons in the coal and coke shipped compared with the first six months of 1934. In the last three months, however, the rate of decrease had been less. The June decrease was the lowest of the year. There was, therefore, some ground for satisfaction, especially when they remembered the difficulties in foreign trade, which did not diminish. Nearly half of the decrease of the port had been at the Commissioners' docks and staiths. This was largely due to the falling off in "bunkers only" shipments. It was stated by the Finance Committee that the revenue from dues was still falling, and was attributable entirely to the drop in coal and coke shipments.

Trade in Petrol Expanding.

Extensive dredging between Northumberland Dock and Jarrow Oil Wharf is to take place. At present this part of the river is dredged to 25 feet at L.W.O.S.T., but in the last eighteen months twelve vessels drawing 25 feet and up to 28 feet have used the oil wharf. Trade is growing, particularly in petrol, and it has been recognised as undesirable that large vessels should have to wait for the tide. In 1927 the imports of petrol were 15,000 tons, whereas last year the quantity was 64,000 tons. A new tank to contain 4,000 tons of Diesel oil has been erected at the wharf. The cost of the suggested dredging is estimated by the Engineer at £8,500, and the Engineer has recommended that in the event of the proposal being agreed to, the necessary maintenance dredging (estimated to cost £4,500) in the western end of Shields Harbour (due to be carried out next year) be done at the same time to make the depth from the Tyne entrance to the Jarrow Oil Jetty 30 feet at L.W.O.S.T.

Sir Arthur Sutherland on Coal Trade.

When Northumberland and Durham coalowners were the guests of the Tyne Improvement Commission on a trip on the river recently, Sir Arthur M. Sutherland, Deputy Chairman of the Commission, who presided, made some interesting remarks regarding the local coal trade. It had been a trying time for the coal trade since the war ended, he said, aggravated as it was by the national coal strike in 1926, which drove trade away from this river which may never return. The strike played into the hands of their keenest competitors, Poland and Germany, and their hold in Europe to-day was one of the causes of the reduced shipments. "As you all know," he added, "the Tyne is magnificently equipped for the quick loading of coal, and the Tyne Commission have spent a lot of money in providing anti-breaking appliances to minimise the breakage of coal during shipment. The collieries are screening, sorting, grading and cleaning coal in order to meet the customers' requirements. The enterprise of the colliery owners in this respect is not sufficiently well known, and we both must strive to secure our full share of what trade is obtainable. A lot of criticism has recently been directed at the Coal Mines Act for decreasing our exports, but it must be remembered that the district committees under the Act fix the minimum prices and the quotas of the coal to be sold. The coal owners are sufficiently alive to their interests not to make the prices too high, nor to make the quota below what is a genuine demand, and it seems probable that if there had been no minimum price, the prices for export would have fallen so low that it would probably have meant pits closed down and increased unemployment among miners. The marketing schemes, whatever else they may have done, have safeguarded prices for the benefit of the miners and the owners alike"

Blyth Harbour Affairs.

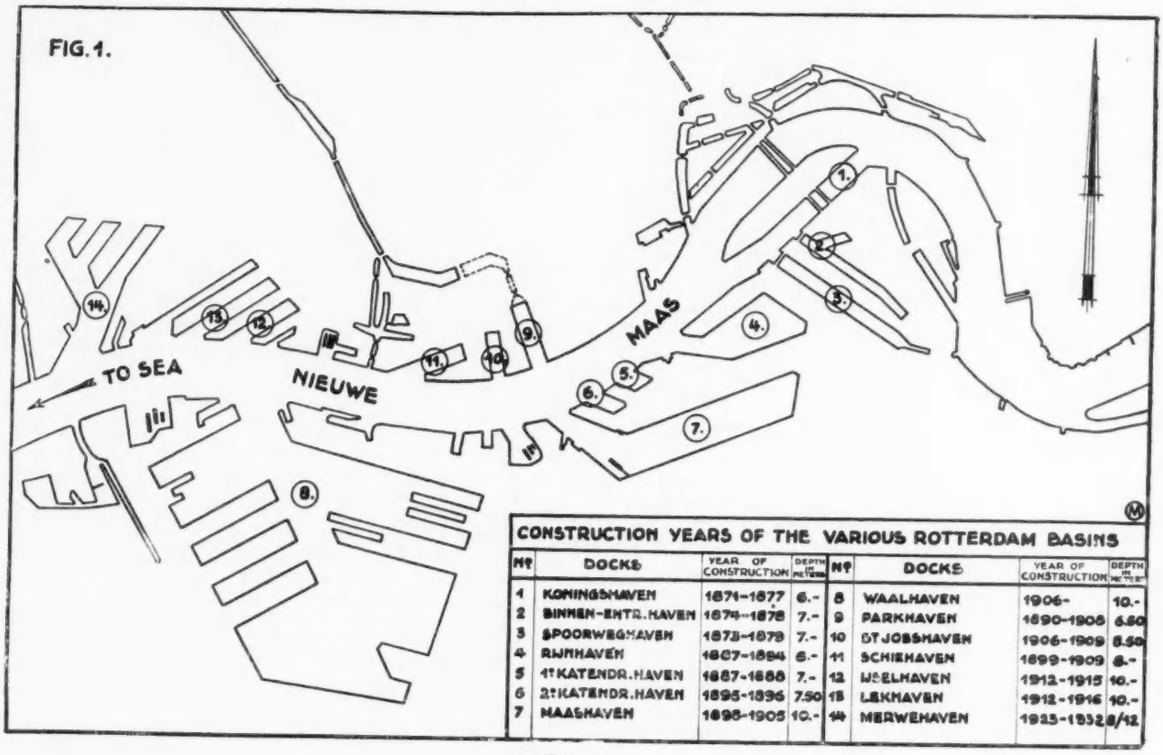
At a meeting of the Blyth Harbour Commission in July, Mr. Ridley Warham (Chairman), submitted the comparative figures for coal shipments for the month of June and for the half-year ended June 30, as follows:—June, 1935, 476,362 tons; June, 1934, 522,754 tons; June, 1929, 443,895 tons. For the half-year ended June 30—1935, 3,055,989 tons; 1934, 3,154,029 tons; 1929, 2,695,136 tons. The shipments for the half-year show a decrease of 3 per cent. on 1934 and an increase of 13 per cent. on 1929.

At the conclusion of the business the Chairman welcomed several guests who afterwards had lunch with the Commissioners and accompanied them on their inspection of the harbour. Among those present were:—Captain A. W. Milburn (Chairman of the North of England Shipowners' Association), Lt.-Col. Arnold Irwin (Chairman of the North-East Coast Exporters' Association), Lt.-Col. K. F. Angus (Vice-Chairman), Mr. John Miller (London and North Eastern Railway), Mr. Arthur Stott (Stephenson Clarke and Associated Companies), Mr. F. Aitchison (Wm. Cory and Sons, Ltd.), Mr. H. E. Dodd (Chairman of the Chartered Shipbrokers' Association), Mr. E. L. Beckingham and others.

Priestman Bros., Ltd., Hull.

Messrs. Priestman Bros., Ltd., of Holderness Foundry, Hull, have recently issued a folder which shows, in colour, the flags of all Governments who have purchased Priestman plant. The folder is a most attractive one, and 60 different flags are featured.

Quay Wall Construction at Rotterdam



Nº	DOCKS	YEAR OF CONSTRUCTION	DEPTH IN METRES	Nº	DOCKS	YEAR OF CONSTRUCTION	DEPTH IN METRES
1	KONINGSHAVEN	1871–1877	6.–	8	WAALHAVEN	1906–	10.–
2	BINNEN-ENTR.HAVEN	1874–1878	7.–	9	PARKHAVEN	1890–1905	6.50
3	SPOORWEGHAVEN	1873–1879	7.–	10	ST JOBSHAVEN	1906–1909	8.50
4	RIJNHAVEN	1867–1884	6.–	11	SCHIEHAVEN	1899–1909	8.–
5	1ste KATENDR.HAVEN	1887–1888	7.–	12	IJSELHAVEN	1912–1915	10.–
6	2de KATENDR.HAVEN	1895–1896	7.50	13	LEKHAVEN	1912–1916	10.–
7	MAASHAVEN	1895–1905	10.–	14	MERWEHAVEN	1925–1932	8/12

Fig. 1.

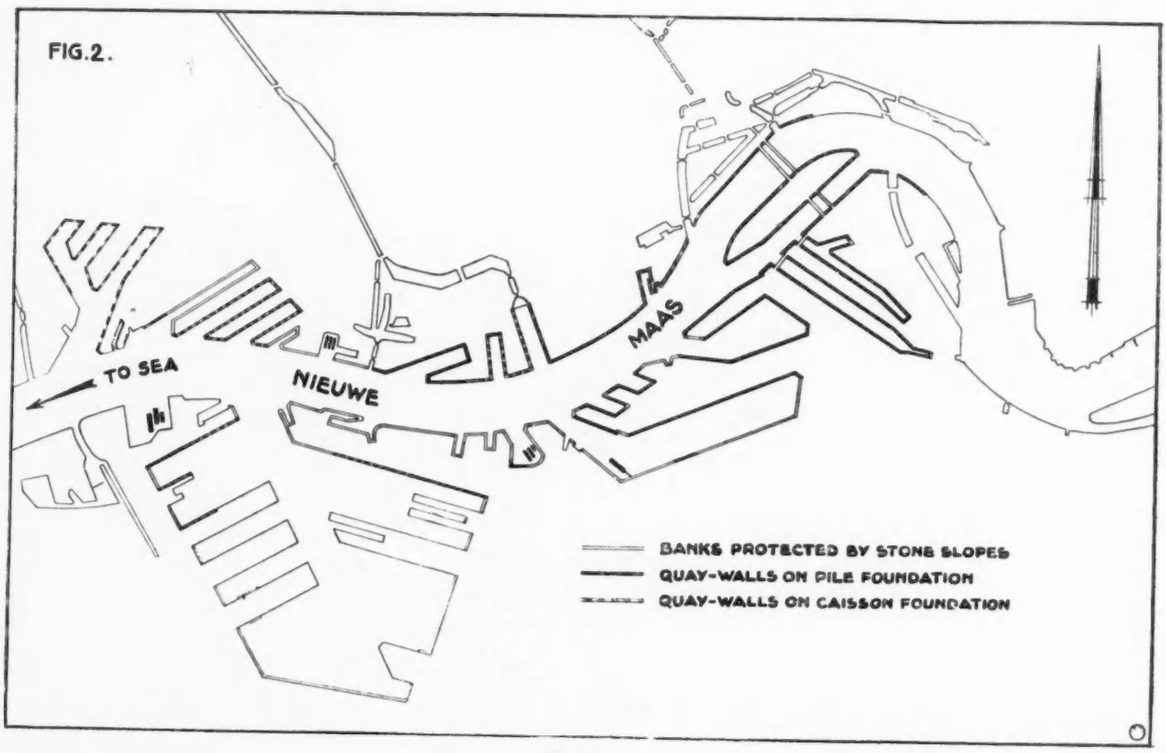


Fig. 2.

The Development of Quay Wall Construction at Rotterdam, Holland

By W. F. van DIJCK, Engineer in the Docks Division of the Works Department, Rotterdam

IN the following article the methods are outlined whereby, in the circumstances prevailing at Rotterdam, the problem of quay wall construction upon soft soil has been met, though not always in an equally satisfactory manner.

In the course of development extending over three-quarters of a century, during which more than 30 kilometres of quay wall have been constructed (Figs. 1 and 2), a considerable amount of valuable experience has been gained, and there has been no neglect to profit by this with every succeeding case of quay wall construction. Hence it is that the Rotterdam quay walls exhibit such a remarkable variety of profile. As a matter of fact, the greater demands continually made by shipping in regard to the depth of water at the quays, the loading of the wharves with merchandise and of the walls with cranes, the application of new building materials such as reinforced concrete and steel sheet-piling, new constructional methods, changing views of the distribution of strength in structures, altered economic conditions, etc., have all combined to call from time to time for revision of the practice previously followed.

Space does not allow of any full description or detailed explanation of that evolution. It can only be sketched on broad lines, upon the basis of some characteristic profiles, and drawing attention to the main factors.

Physical Conditions.

Some information of a general character, concerning water levels, nature of soil, etc., which is necessary for the understanding of what follows, is given first.

The low-lying western section of the country arose from the deposit of sand and clay, brought down by two great rivers, the Rhine and the Meuse (or Maas) which flow into the North sea. At that time those districts must have formed an extensive morass, intersected by rivers and creeks, covered for the greater part by forests. With high sea and river levels, the land was repeatedly inundated; after every such inundation a thin layer of sand or mud was left behind. From decayed vegetation low bogs were formed in the course of time. The

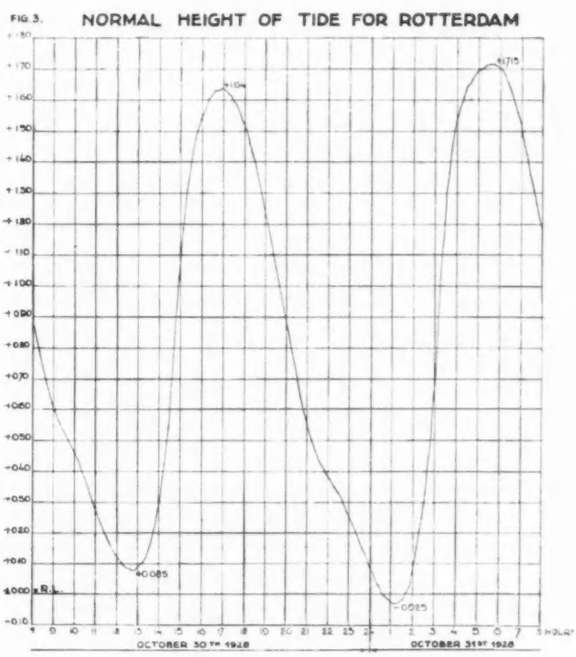


Fig. 3.

fact that now, at great depths below sea-level, layers of bog are met with, must certainly be attributed to a continual subsidence of that part of the crust of the earth; the rate of this has been estimated at about 20 centimetres per century. Human endeavour wrested that land from the water by surrounding it with dykes, then draining and cultivating the land, so that it has been transformed into a flourishing rural area.

Six hundred years ago, on the northern tributary of the Rhine, called the Maas, at a distance of about 30 kilometres (19 miles) from the estuary, a settlement arose which became the City of Rotterdam. In the second half of last century, the fairway between Rotterdam and the sea was artificially improved in such a manner that at present vessels with a draught of 9 metres (29½ ft.) are able to proceed up to Rotterdam at all times, and vessels with a draught of 10½ metres (31 ft.) at high tide.

Tide Levels.

The influence of ebb and flow extends up to and past Rotterdam. The tidal range at Rotterdam amounts normally to 1½ metres (5 ft.), the water level varying from R.L. (Rotterdam water level) to 1½ metres above that level.* Water levels lower than ½ metre below R.L. and higher than 2½ metres above it seldom occur and are only of short duration. The lowest and highest levels known are 1.30 metres below R.L. and 3.91 metres above it (Figs. 3 and 4).

Sea water does not penetrate to Rotterdam, hence there is no danger here of the piles being affected by the ship-worm, nor need the harmful influence of salt water upon works in Portland cement concrete be feared.

The comparatively slight difference of tide-levels, makes open communication possible between the river and the several excavated basins. In comparison with the above-mentioned highest known water level, the quay walls at present being constructed and the new wharves are raised to a level of 4 metres (13 ft.) above R.L. The raising of the areas surrounding the docks or basins and along the river banks, left by nature at about the height of low-water level, is effected with the material derived from dredging the basins. For years past this has been done by means of suction-dredgers.

Nature of Soil.

Down to a great depth below meadow level, the soil is composed of varying strata of clay and bog, and has only a small bearing capacity. Under the weight of the burden imposed upon it, the soil undergoes a great and irregular settlement, which continues for a considerable period of time; it is also easily displaced laterally. When the deposit of material is in progress, it has frequently been observed that along the edge of a tipping bank from 3 to 4 metres high, the marsh or meadow land had moved laterally and risen up to above the level of the tipping bank. A building or structure of any appreciable weight cannot be carried by such ground.

Below the weak upper strata, however, at a depth varying from (say) 8 to 20 metres (25 to 65 ft.) below R.L., a thick layer of sand is met with everywhere, sometimes mixed with gravel, having sufficient carrying capacity. In Figs. 5 and 6 some borehole records and their situations are given.

Piled Foundations.

The weights of buildings and other structures are transferred to the aforesaid sand and gravel stratum, generally by means of driving timber piles.

Round fir piles are easily obtainable, in a great variety of dimensions, at Rotterdam. Lengths of 16 to 22 metres (50-70 ft.) and top diameters of from 25 to 50 centimetres (10 to 20 ins.) are usual. The piles are obtained principally from the Black Forest in Germany and from Czecho-Slovakia, and are brought down in rafts on the Rhine.

During the past thirty years many square sawn pitch-pine and Oregon-pine piles have also been employed: these are imported in large dimensions (30 to 45 centimetres or 12 to 18 ins. square) from America.

The thinner fir piles having a top diameter of 25 to 30 centimetres are usual for private buildings, the thicker ones of 30 to 50 centimetres top diameter in marine construction, such as for foundations of quay walls, for fender works, wharves and dolphins.

Upon the thinner piles it is customary to impose a load of 10 tons, provided the piles have been driven to a proper foundation, the point of the pile penetrating from 1 to 2 metres in the firm sand stratum. Upon the thicker piles a load of from 30 to 45 tons is imposed.

Piles of reinforced concrete are little used in Rotterdam, primarily because a foundation upon timber piles generally proves to be cheaper, and further because of certain technical objections to the use of concrete piles, owing to the great weight and the brittleness of the material in comparison with timber piles.

* By R.L. (Rotterdam Level) is meant the horizontal datum level from which the various heights and depths are measured.

Quay Wall Construction at Rotterdam

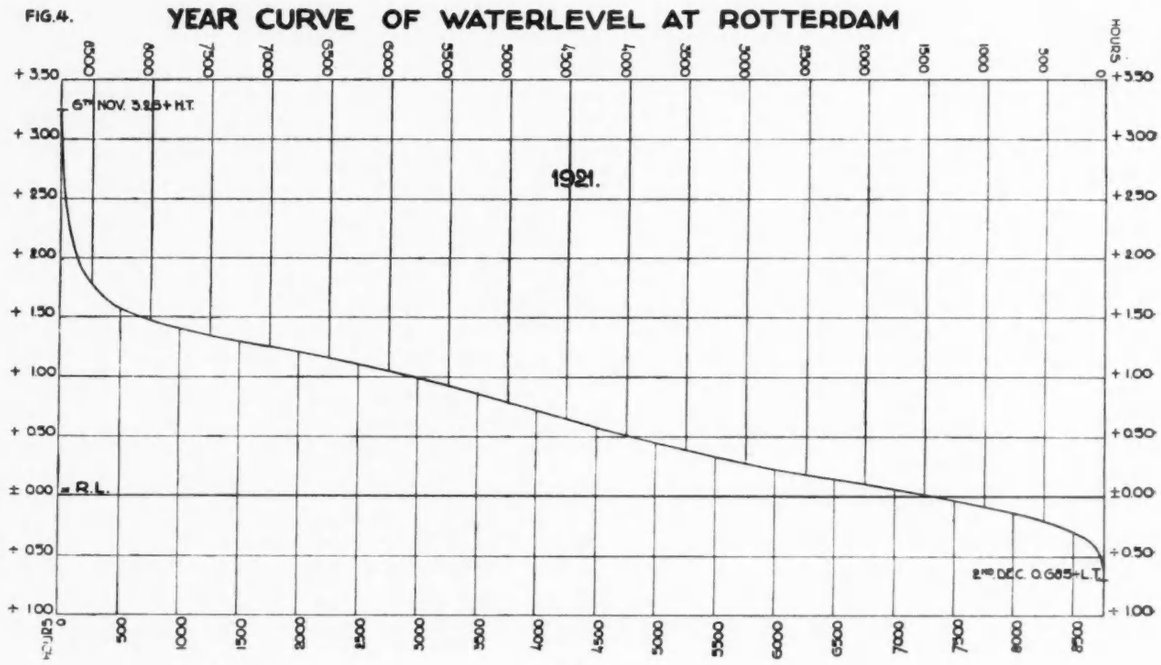


Fig. 4.

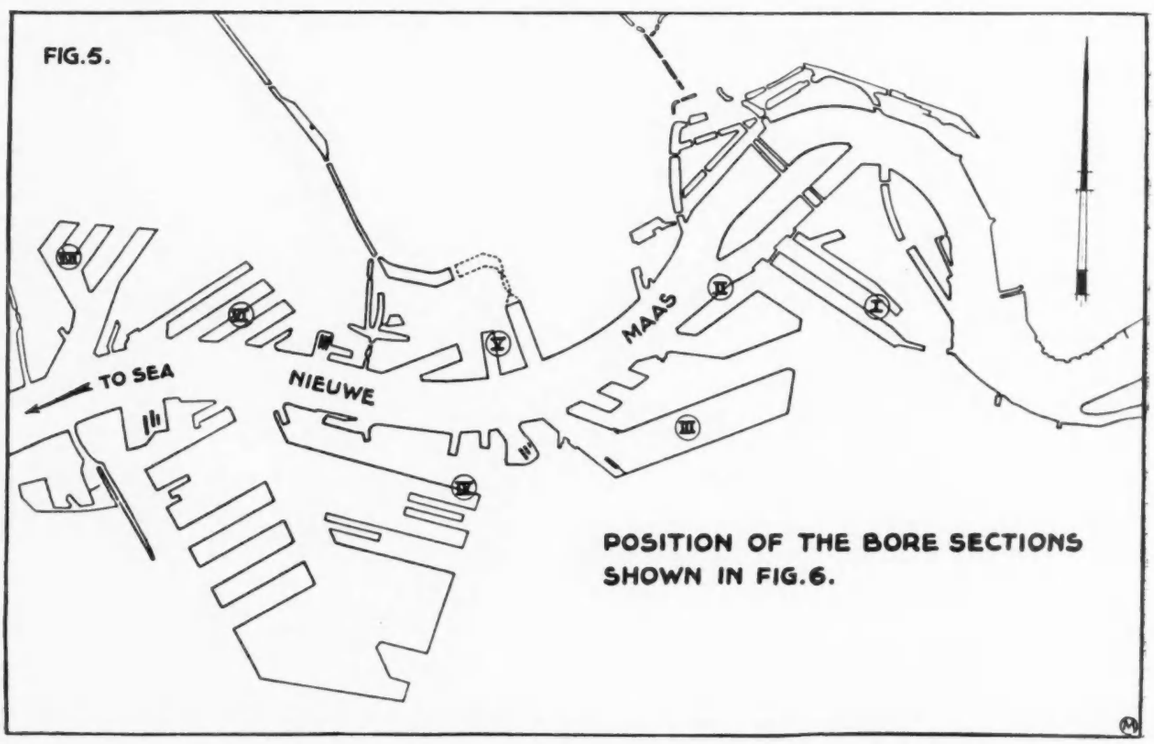


Fig. 5.

Quay Wall Construction at Rotterdam—continued

Wall Construction.

As already stated, the soil at Rotterdam is of such a nature that a building construction of any considerable weight cannot be carried by it. As regards quay walls, that experience was acquired as far back as in 1853. Along the north bank of the river, at the Boompjes quay, a wall was constructed in accordance with the cross section, shown in Fig. 7. Upon a foundation of fascines was deposited a dyke up to low-tide level, of large basalt blocks, and upon that dyke was built a wall of basalt. A considerable length of that wall fell in almost immediately after the filling was done.

Between the years 1874 and 1877, in the construction of the quay walls along the Binnenhaven, Entrepothaven, Spoorweghaven and Koningshaven (see Figs. 8 to 11 inclusive), the error was committed of carrying out the constructional works before excavating the basin to the full depth and raising the surrounding ground. In saying this, however, it must at once be observed that such error was not by any means to be seriously charged against those who were entrusted with the design and execution of that work, considering that they were faced, for the first time, with the task of constructing quay walls for great depths of water, concerning which there had been little or no previous experience.

FIG.6.

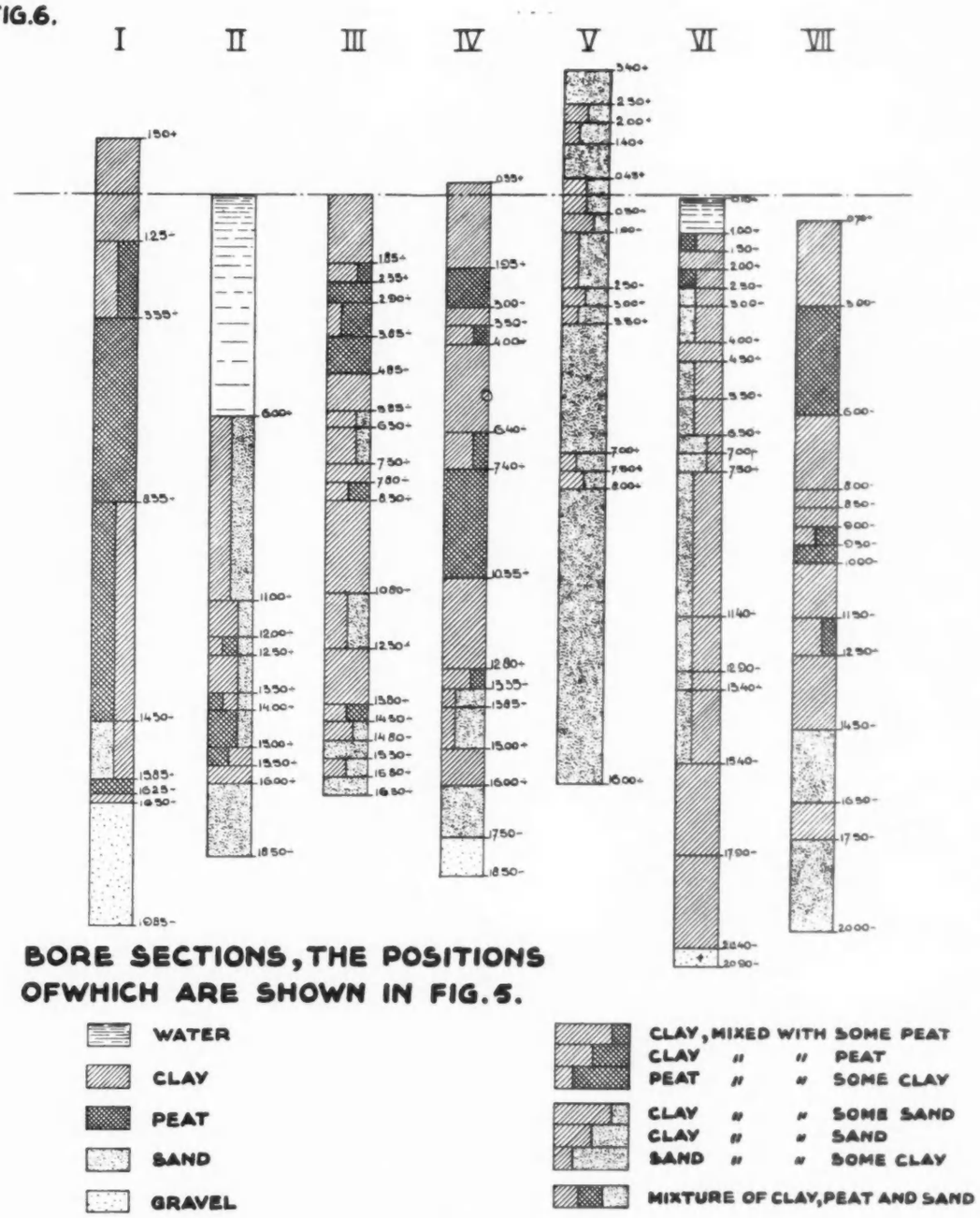


Fig. 6.

The dredging of the ground to a great depth for the formation of a basin on the one hand and the raising of the surrounding ground on the other hand, caused a great disturbance of equilibrium in the soil along the bank. The results of this have been landslides and subsidences of the river banks.

From the nature of things, such disturbances of equilibrium are fatal for any quay wall already erected. Construction of the quay wall should only be proceeded with *after* the restoration of the disturbed equilibrium.

During the excavation of the basin and filling in behind the walls, these suffered considerable displacements, accompanied by cracks in the walls and the vaults. Horizontal movements of 1½ metres (5 ft.) and more were observed immediately after filling in. The cellar spaces, which are shown in Fig. 9, have never been fit to be used, owing to the percolation of water through cracks in the walls and floors. By various means, which need not be discussed, these structures, which were rather complex and costly, have been preserved from

Quay Wall Construction at Rotterdam—continued

absolute ruin. Recently, however, the decision has had to be taken to pull down part of the wall along the west side of the Binnenhaven and to replace this by a new wall.

Along the right bank of the Maas, a quay wall was constructed in 1883, the cross section of which is shown in Fig. 12. The basic idea upon which that construction was effected, is the principle of building over the natural slope of the bank. Comparatively thin piles, of 25 to 30 centimetres top diameter were driven in rows perpendicular to the front of the quay wall at intervals of 1 metre. The piles in each row are connected

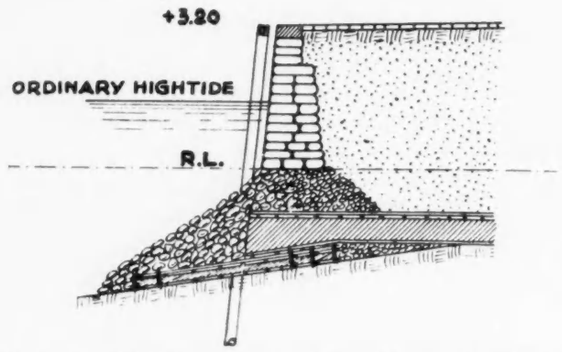


Fig. 7. Quay Wall along Boompjes. Years of Construction 1850-1853.

by a capping having a section of 25 by 30 centimetres forming a trestle. A wooden floor is spiked over the pile caps, having a thickness of 10 centimetres. Along the front of the floor a basalt wall is built. The wall is finished with a coping of granite. The backing of the wall is effected with river sand. To prevent any escape of the dumped soil behind the wall, in the event of the natural slope of the ground under the floor becoming flattened in the course of time, a bank of clay filling is introduced for safety's sake over the back of the floor. To avoid contact between a ship moored to the quay and the shore, by which both might suffer injury, a fender has been placed along the front of the wall, consisting of heavy piles rammed in at intervals of 5 metres, connected by means of a waling introduced at the height of the top of the wall. Mooring to the fender work is also effected. Every third guard-pile protrudes about 1 metre above the waling and is tied back through the wall to a fixed anchorage in the ground to the rear. By this method of construction, it is ensured that no pulling forces are exerted on the wall.

According to the type of construction just described, quay walls extending for many kilometres have been built at Rotterdam, though the style has been improved in several respects.

Improvements.

In the first place, the style has been improved by including *buttress-piles* in the construction. The filling behind the wall exercises a forward pressure upon it, to which resistance must be made by bending-stress, induced in the piles buried in the ground. For piles, however, protruding for a great length above the ground, this resistance by bending-stress is very slight. Additional resistance can be offered to the ground pressure by the buttress piles. Nor is the introduction of buttress piles in quay walls upon piled foundations being neglected. The buttress piles at a rake of 3 to 1, i.e., as slanting as possible, are driven by ordinary pile-driving plant. With the soil conditions that prevail in Rotterdam, a natural slope under water is found at an inclination of perhaps 1 in 3, or still less pronounced. Should a great depth be required immediately in front of the quay wall, the building over of the natural slope will necessitate a very broad and consequently expensive floor, resting upon piles. In order to meet that objection, the formation of a fascine dyke (Fig. 13) enables the slope which is to be built over to take an incline of 1 in 1.

The fascine dyke consists of a succession of sunk mattresses reaching from 1 metre below the bottom of the basin up to low-water level or just below it. These submerged mattresses have a thickness of about half-a-metre. They are composed and plaited in regular formation, of fresh tough branches and twigs of the water-willow, which grows abundantly in the lands adjoining the dykes along the great Dutch rivers. The mattresses are made upon a flat bank which is exposed at low water but inundated at high tide. At high tide the completed mattress is floated and towed to the place where is has to be sunk. During the change of tide at low water it is sunk with a ballasting of stones and afterwards strewn with sand.

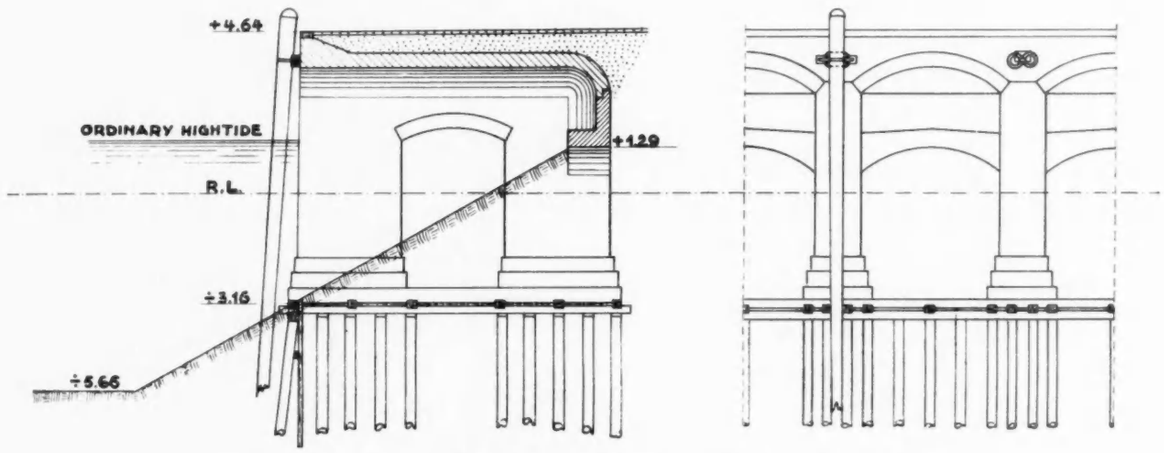


Fig. 8. Quay Wall along Entrepot Dock. Years of Construction 1874-1877.

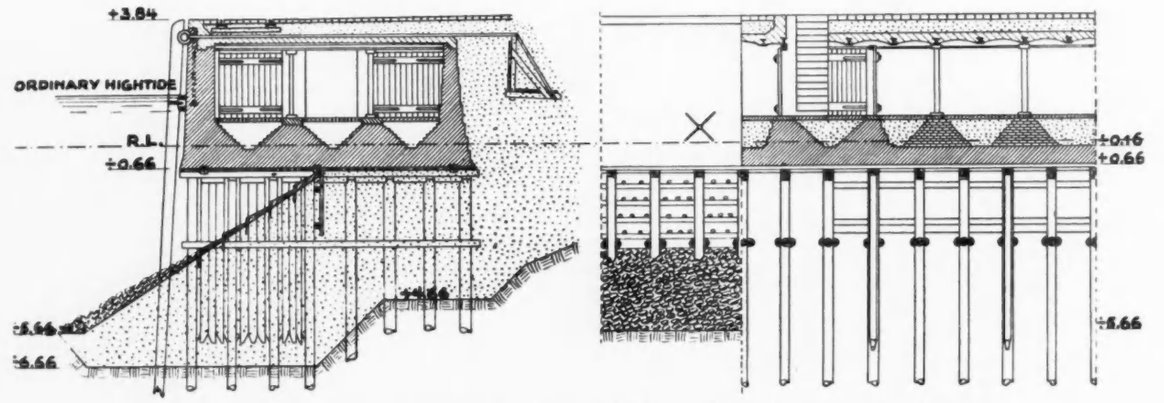


Fig. 9. Quay Wall along Binnenhaven (Interior Dock). Years of Construction 1874-1877.

Quay Wall Construction at Rotterdam—continued

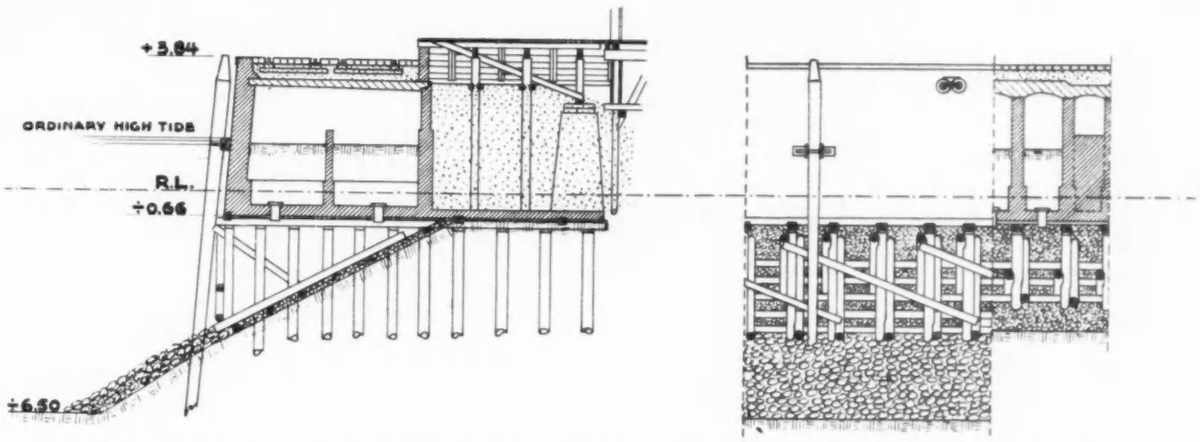


Fig. 10. Quay Wall along Spoorweghaven (Railway Dock) East Side. Years of Construction 1874-1877.

At first the fascine dykes were caused to rest on the soft ground of the natural bottom, the mattresses were then strewn with loose soil and the filling behind the dyke was effected with dredged material. Consequently they underwent a very slow settlement which had an unfavourable effect upon the piles driven through the fascine dyke. The piles received a very considerable secondary load from the sinking dyke. The loose filling further exercised a lateral pressure upon the fascine dyke that was in turn transferred to the piles. It frequently occurred that under the combined influence of the downward drag and the lateral pressure, the piles split and broke.

With quay walls constructed later, the method was improved by dredging away the soft soil at the place where the wall was to be built, down to the firm sand stratum, and replacing it by

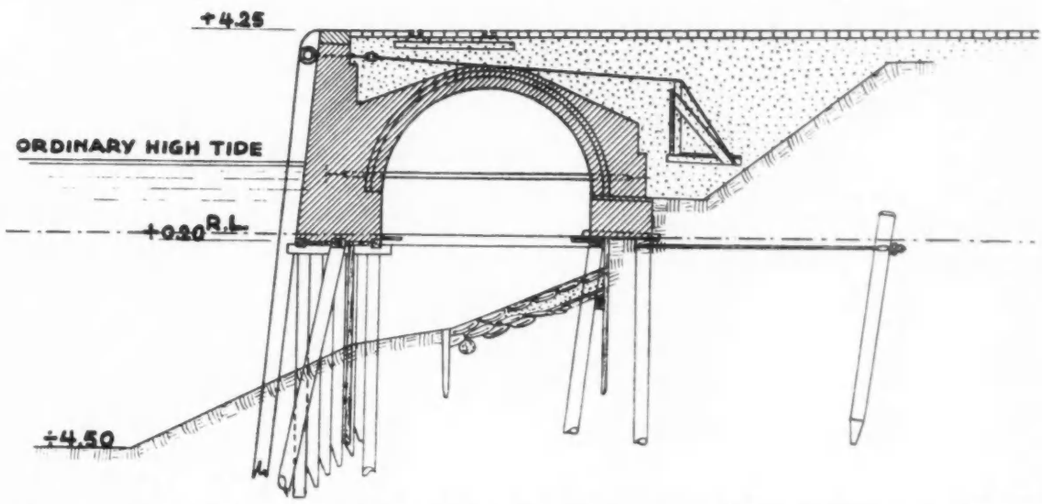


Fig. 11. Quay Wall along Koningshaven (Kings' Dock, Stieltjes Quay). Years of Construction 1874-1877.

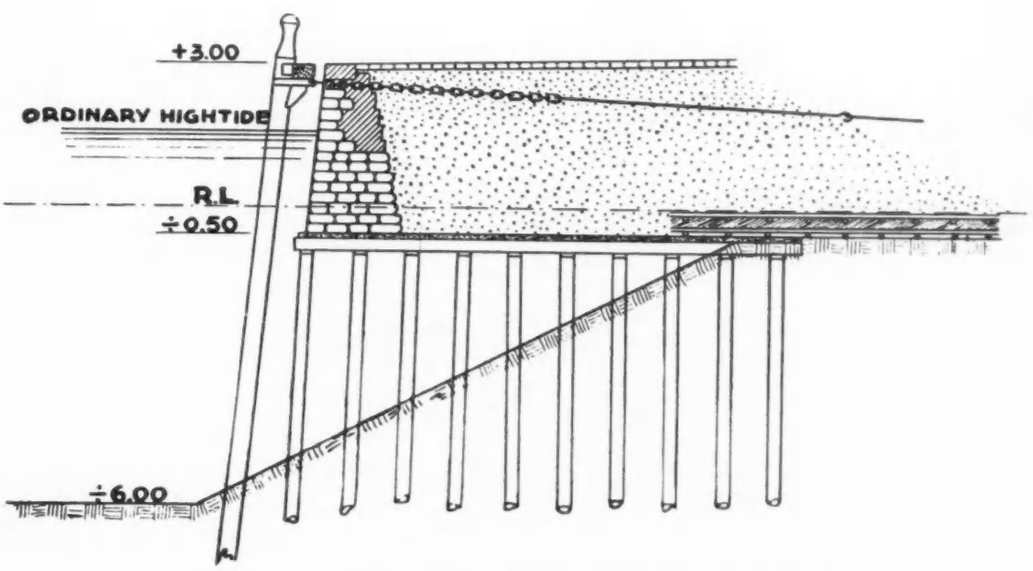


Fig. 12. Quay Wall along Boompjes. Year of Construction 1883.

Quay Wall Construction at Rotterdam—continued

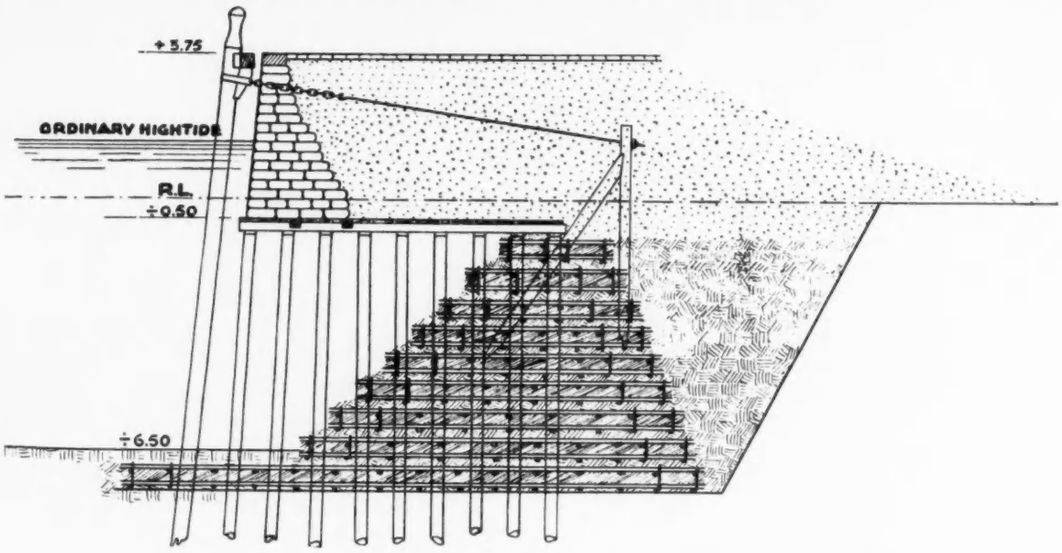


Fig. 13. Quay Wall along Wilhelmina Quay. Years of Construction 1890-1892.

sand. Hence an improvement of the ground was obtained. Further, the mattresses were also strewn with sand and the rear filling of the fascine dyke was effected with sand (Fig. 14).

With the driving of the comparatively thin piles that had been customary until then, through the mattresses strewn with sand, difficulties were now experienced owing to the greater resistance the piles had to overcome during driving. The use of heavy piles, of an average size of about 40 centimetres, was then adopted. For driving these heavy piles, heavy steam-hammers (of Morrison type) had to be procured.

Considering that the piles could now be more heavily loaded, they were placed farther apart from each other, generally at distances of 1.60 to 1.90 metres. Those distances could hardly be bridged by a wooden floor, so a reinforced concrete floor was substituted. Thus arose a form of quay-wall construction, as shown in Fig. 14.

The superstructure, erected upon the floor, consists of a wall of concrete, faced with basalt on the outside and finished with a coping of granite. The lower part of the wall, built of blocks moulded in advance, is of such a height that when the blocks are put in their place with the aid of a floating crane, the upper part stands above normal high water. The blocks are keyed into each other with tongue and groove. The further construction is effected on the spot; the building of the facing, the deposit of concrete, etc.

Diving Bell.

The carrying out of the work upon the floor below low-water level, either of timber or concrete, is effected with the aid of a diving-bell (Fig. 15). The diving-bell used in Rotterdam has a working space of 21 metres in length, 13 metres in breadth and 2.40 metres in height, or about 70 by 40 by 8 ft. The working space is accessible for men by way of two air shafts. For the conveyance of materials two separate tubes have been introduced. On the vessel attending upon the diving-bell are the machines for air supply, for pumping water into the ballast tanks and for electric lighting of the working space.

(To be continued).

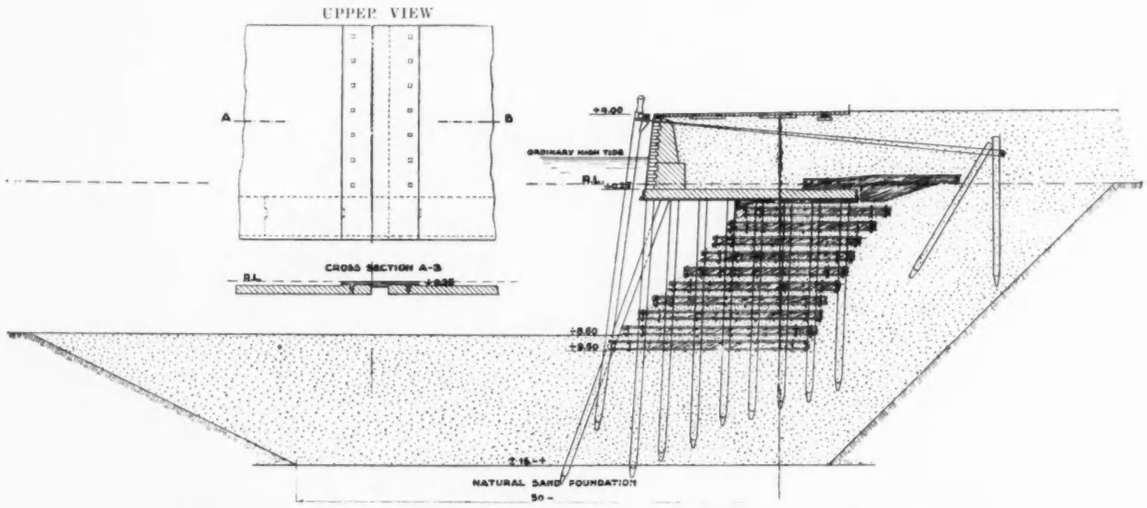


Fig. 14. Quay Wall along Maas Dock (North Side). Years of Construction 1907-1908.

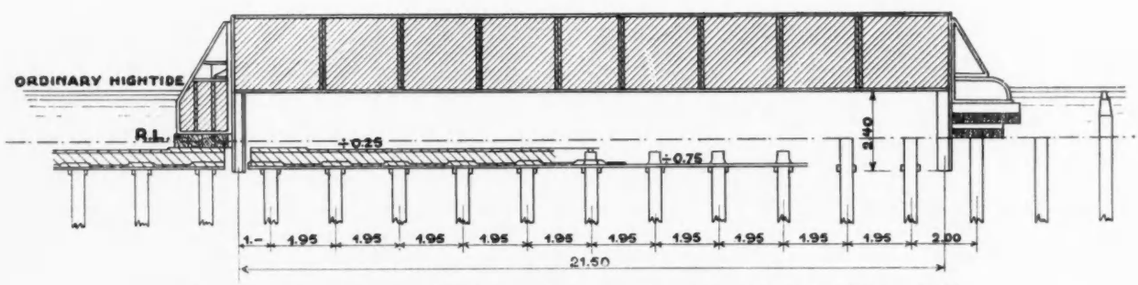


Fig. 15. Construction of Reinforced Concrete Floorplate with aid of Diving Bell.

The Port of Amsterdam

Statistics for the Port of Amsterdam in regard to number of vessels and tonnage and to goods traffic arrived and sailed, as compared with corresponding figures of last year, are as follows:—

SEAGOING VESSELS AND TONNAGE.

	ARRIVALS No.	Per Cent.	N.R.T.	Per Cent.	SAILINGS No.	Per Cent.	N.R.T.	Per Cent.
June 1934 ...	261		345,413		280		369,813	
,, 1935 ...	227		321,272		231		327,158	
	—34	—13·03	—24,141	—6·99	—49	—17·50	—42,655	—11·53
May 1935 ...	227		323,429		231		344,130	
June 1935 ...	227		321,272		231		327,158	
	...	—	—2,157	—0·67	—	—	—16,972	—4·93
Jan.-June '34	1,598		2,298,685		1,617		2,331,670	
,, '35	1,425		2,139,884		1,429		2,151,525	
	—173	—10.83	—158,801	—6·91	—188	—11·63	—180,145	—7·73

SEAGOING GOODS TRAFFIC.

(In Tons of 1000 Kilos*).

	1 Import	2 Transit incl. in col. 1	3 Export	4 Transit incl. in col. 3	5 Total col. 1 & 3
May 1934	302,984	48,773	125,580	51,468	428,564
,, 1935	236,051	54,869	133,506	63,473	369,557
	—66,933	+6,096	+7,926	+12,005	—59,007
	—22·09%	+12·50%	+6·31%	+23·33%	—13·77%
April 1935	256,647	60,132	129,279	55,006	385,926
May 1935	236,051	54,869	133,506	63,473	369,557
	—20,596	—5,263	+4,227	+8,467	—16,369
	—8·03%	—8·75%	+3·27%	+15·39%	—4·24%
Jan.-May 1934 ...	1,506,245	278,586	653,538	252,918	2,159,783
,, 1935 ...	1,346,498	309,631	720,488	311,672	2,084,986
	—141,747	+31,045	+66,950	+58,754	—74,797
	—9·41%	+11·14%	+10·24%	+23·23%	—3·46%

* These figures have been taken from the monthly statistics of the Central Bureau, The Hague, Holland.

Classified according to flag the number of vessels which entered the Port of Amsterdam during June, was:—Netherlands, 117; Great Britain, 50; German, 21; Swedish, 16; Norwegian, 12; Danish, 2; American, 1; French, 1; Greek, 1; Finnish, 2; Italian, 1; Russian, 3.

Vessels laid-up at Amsterdam:—1st June, 1935—18 vessels, measuring 116,351 tons gross; 1st July, 1934—20 vessels, measuring 117,793 tons gross; 1st July, 1935—13 vessels, measuring 85,608 tons gross.

Dublin Contract for Vickers (Ireland) Ltd.

At a meeting of the Dublin Port and Docks Board on 8th August, attention was drawn to the fact that Messrs. Vickers (Ireland) Ltd., had secured in open competition the contract to build a new steam hopper for the Board.

The Chairman (Mr. T. F. Laurie) said that Messrs. Vickers (Ireland) Ltd. had not only submitted the lowest tender, £22,730, but they had promised the earliest delivery (within 35 weeks, whereas the nearest tender by a competitor was 37 weeks).

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Port of Southampton

Docks Statistics for July.

Not for some years have the Southern Railway Company been able to issue such satisfactory figures in respect of traffic at Southampton Docks as those for the month of July.

Compared with the corresponding month of last year, considerably more than 100 extra vessels were handled both inward and outward. Tonnage returns mounted by hundreds of thousands of tons, cargo traffic showed a big increase, and the number of passengers dealt with marked a surprisingly large increase.

This very pleasing state of affairs can be attributed to the improved economic outlook. The increased number of people travelling on the North Atlantic has played a big part in swelling the passenger total. Cruising has also been highly popular, and the cross-Channel traffic has also added its quota to the large total.

The number of ships inward for the month was 425, compared with 315 in July, 1934, and outward 424, as against 310. This gives increases of 110 vessels inward and 114 outward.

Tonnage, as might be expected with so many extra vessels using the docks, mounted in very satisfactory style. Inward the gross tonnage rose from 1,667,204 tons in July last year to 2,139,401 tons, and outward from 1,583,337 tons to 2,138,562 tons—advances of 472,197 tons inward and 555,225 tons outward. The net figures were equally impressive, for there was an increase of 275,340 tons inwards and 315,084 tons outward. The totals were: Inward 1,137,154 tons, as compared with 861,814 tons; outward 1,133,311 tons, as against 818,257 tons.

The only decrease in the statistics was that dealing with outward cargo, but as the drop was only 96 tons it can be regarded as negligible. Moreover, this small loss was swallowed up by an increase of 17,194 tons in inward cargo. Imports amounted to 82,400 tons, contrasted with 65,206 tons in July, 1934, and exports were 29,196 tons, as against 29,592 tons.

The highly gratifying passenger figures have already been mentioned. Over 33,000 more travellers passed through the docks in July last than was the case a year ago. Arrivals numbered 55,303, an advance of 17,429 over the 37,874 dealt with in July, 1934, and 15,883 more passengers departed, the total of 53,553 easily eclipsing the corresponding return of last year of 37,670.

Port of London Notes

London's Shipping.

During the seven days ended 26th July, 1,143 vessels, representing 1,049,520 net register tons used the Port of London. Of these 563 vessels (843,485 net register tons) were to and from Empire and Foreign ports and 580 vessels (206,035 net register tons) were engaged in coastwise traffic.

Thirty-two timber laden vessels arrived at the Surrey Commercial and Millwall Docks with 59,797 tons of softwood.

* * * *

During the seven days ended 2nd August, 1,102 vessels, representing 1,028,946 net register tons, used the Port of London. Of these, 536 vessels (819,127 net register tons) were to and from Empire and Foreign ports, and 566 vessels (209,819 net register tons) were engaged in coastwise traffic.

Twenty-two timber laden vessels arrived at the Surrey Commercial and Millwall Docks with 28,738 tons of softwood.

* * * *

During the seven days ended 9th August, 954 vessels, representing 1,024,007 net register tons, used the Port of London. Of these, 522 vessels (859,093 net register tons) were to and from Empire and Foreign Ports, and 432 vessels (164,914 net register tons) were engaged in coastwise traffic.

Thirty-four timber-laden vessels arrived at the Surrey Commercial and Millwall Docks with 60,850 tons of softwood.

* * * *

During the seven days ended 16th August, 1,232 vessels, representing 1,039,392 net register tons, used the Port of London. Of these, 533 vessels (829,103 net register tons) were to and from Empire and Foreign Ports, and 699 vessels (210,289 net register tons) were engaged in coastwise traffic.

Twenty-five timber-laden vessels arrived at the Surrey Commercial and Millwall Docks with 38,700 tons of softwood.

* * * *

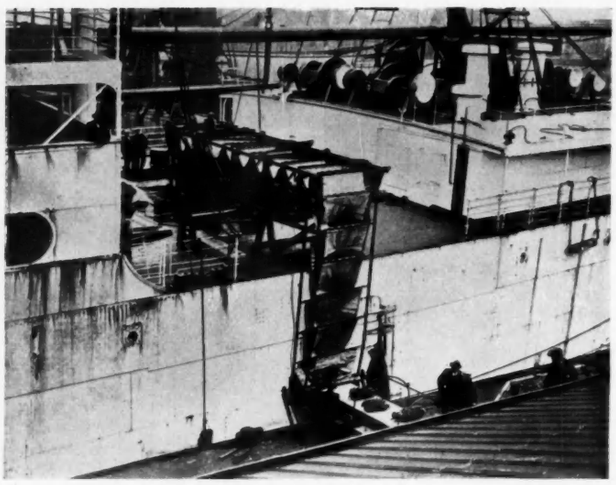
During the week ended 23rd August, 1,133 vessels, representing 1,134,670 net register tons, used the Port of London. Of these, 538 vessels (930,640 net register tons) were to and from Empire and Foreign Ports, and 595 vessels (204,030 net register tons) were engaged in coastwise traffic.

Twenty-two timber-laden vessels arrived at the Surrey Commercial and Millwall Docks with 31,619 tons of softwood.

Notes of the Month

Shipping, Engineering and Machinery Exhibition.

At the forthcoming Shipping, Engineering and Machinery Exhibition, which is being held at Olympia from September 12th to 28th, The Renold and Coventry Chain Co., Ltd., of Renold Works, Didsbury, Manchester, propose exhibiting a wide range of the chains which they manufacture for every type of power transmitting, conveying and elevating. The applications of these chains in the three industries covered by the Exhibition, are too numerous to detail, but driving chains are manufactured by this firm, varying from 8 mm. pitch with a breaking load of 800 lbs. to an 8-in. pitch duplex roller chain with a breaking load of 1,000,000 lbs.



Renold Chain on Banana Conveyor.

This Company are also exhibiting a range of chains specifically designed for Diesel engine camshaft and auxiliary drives, and other products which will be shown are chain clutches, Renold chain couplings, Renold-Hardy flexible couplings, push-pull remote control and chain speed transformers.

The Port of Rotterdam.

The Chamber of Commerce and Industry of Rotterdam has recently issued the statistics concerning the movement of sea-going ships in the New Waterway, and which are as follows: During July, 1935, 920 ships with a net registered tonnage of 1,552,361 entered the Port of Rotterdam, as compared with 997 ships of 1,630,714 n.r.t. during July, 1934. The number of ships entering for the small ports in the environs were 222 of 421,645 n.r.t., as compared with 220 of 375,505 n.r.t. in July, 1934.

For the seven months ending July, 1935, 6,298 ships of 10,260,700 n.r.t. entered the Port of Rotterdam, as against 6,538 ships of 10,230,206 n.r.t. for the corresponding period of 1934. The number of ships entering for the small ports in the environs of Rotterdam during the first seven months of 1935 were 1,397 of 2,808,878 n.r.t., as compared with 1,532 ships of 2,693,390 n.r.t. in the corresponding period of 1934.

After deducting the number of ships counted more than once in the different ports, the number of entrances during the month of July, 1935, amounted to 1,088 vessels of 1,838,946 n.r.t., as compared with 1,176 vessels of 1,907,974 n.r.t. in July, 1934. For the first seven months of 1935 the total entrances were 7,278 vessels of 11,936,130 n.r.t., as compared with 7,631 vessels of 11,979,874 n.r.t. for the corresponding period of 1934. These figures are for the whole region of the Port of Rotterdam with its environs, comprising the delta formed by the mouths of the Rivers Rhine and Meuse.

Launch of H.M. Ships "Greyhound" and "Griffin."

Two destroyers of the British Admiralty 1933 Programme were launched at the Naval Construction Works of Vickers-Armstrongs Ltd., at Barrow-in-Furness, on August 15th. They have been given the names of "Greyhound" and "Griffin." The "Greyhound" was launched by Lady Maureen Stanley, the wife of the President of the Board of Education, and the "Griffin" by Mrs. Noble, the wife of Vice-Admiral P. L. H. Noble, C. B., C. V. O., the 4th Sea Lord and Chief of Supplies and Transport. Admiral Noble accompanied his wife to Barrow, but unfortunately Major The Hon. Oliver Stanley was unable to be present.

Flap Dock Gate for Sweden.

We are informed that Messrs. Sir William Arrol and Co., Ltd., Glasgow, have just received an order from Sweden for a dock gate for a new graving dock to be built in the Port of Halsingborg. Before placing this order the Swedish authority made an extensive examination of various types of gates and caissons, as supplied by Continental and British contractors, and as a result decided that the "Box" flap dock gate under patents held by Mr. Edward Box, M.I.C.E., was the most suitable for their purpose.

A similar gate was supplied by Messrs. Sir Wm. Arrol and Co. for Messrs. Barclay Curle's new dock at Elderslie, and at the present time Messrs. Arrol have two further gates of this type under construction.

It may be recalled that Sir A. Steven Bilsland, Bt., recently paid a visit to Sweden and was much impressed by the good-will felt towards this country and by the evidence shown of the desire to buy from us. An exhibition of Scottish products is to be held early next year in Stockholm.

Sweden's close commercial affinity with Germany is probably well-known, but since the conclusion of the Anglo-Swedish trade agreement which came into operation on July 7th, 1933, a much greater share of Swedish imports, particularly coal, has been purchased in this country.

The Port of Copenhagen.

The number of ships which entered the Port of Copenhagen during July, 1935, was as follows:—From inland ports 1,972 steam and motor ships arrived of 245,517 n.r.t., and 16 sailing vessels arrived of 2,916 n.r.t. Shipping arriving from foreign ports amounted to 1,015 steam and motor ships of 591,814 n.r.t., and 17 sailing vessels of 7,273 n.r.t. The total of steam and motor ships and sailing vessels arriving from both inland and foreign ports for July amounted to 3,020 vessels of 847,520 n.r.t.

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